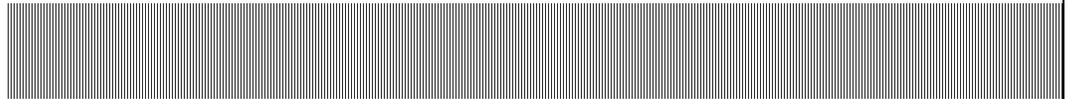


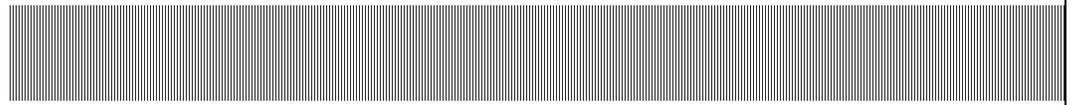
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Tables



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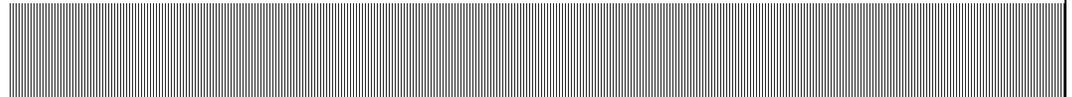
Section I



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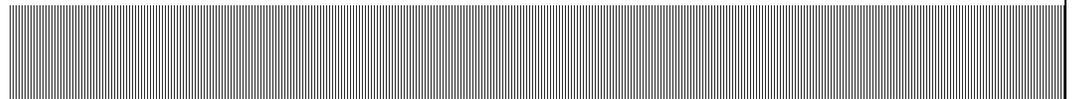
Chapter 1 Tables

There are no tables associated with this chapter.



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Section II



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Chapter 2 Tables

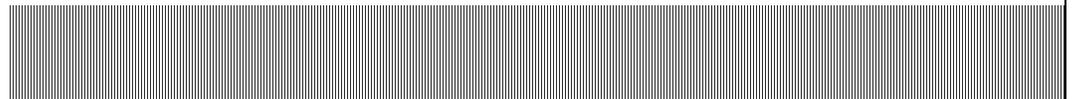


Table 2-1: Occurrences of Rare Species and Habitats in the Study Area

Common Name	Scientific Name	State Status ^a
Barred Owl *	<i>Strix Varia</i>	T/T
Black-throated Green Warbler	<i>Dendroica virens</i>	S/S
Broad-Winged Hawk	<i>Buteo platypterus</i>	SC/RP
Eastern Box Turtle	<i>Terrapene carolina carolina</i>	SC
Fowler's Toad	<i>Bufo wodhousee fowleri</i>	SC
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	T/SC
Gray-cheeked Thrush	<i>Catharus minimus</i>	S/SC
Great Blue Heron *	<i>Ardea herodias</i>	SC/S
Least Flycatcher	<i>Empidonax minimus</i>	SC
Long-eared Owl	<i>Asio otus</i>	T/T
Peregrine Falcon	<i>Falco peregrinus</i>	E
Pied-Billed Grebe *	<i>Podilymbus podiceps</i>	E/S
Red-headed Woodpecker	<i>Melanerpes erthrocephalus</i>	T/T
Red-shouldered Hawk	<i>Buteo lineatus</i>	E/T
Savannah Sparrow	<i>Passerculus sandwichensis</i>	T/T
Wood Turtle *	<i>Glyptemys insculpta</i>	T
Featherfoil *	<i>Hottonia inflata</i>	E
Virginia Pennywort	<i>Obolaria virginica</i>	
Low Spearwort	<i>Ranunculus pusillus var. pusillus</i>	
Black-crowned Night-Heron Foraging Habitat	<i>Nycticorax nycticorax</i>	T/SC
Colonial Waterbird Foraging Habitat		
Colonial Waterbird Nesting Habitat		
Yellow-crowned Night-heron Foraging Habitat	<i>Nyctanassa violacea</i>	T/T
Yellow-crowned Night-heron Nesting Habitat	<i>Nyctanassa violacea</i>	T/T

a: Status for animals separated by a slash indicates a dual status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

E=Endangered species

RP=Regional Primary

S=stable species

SC=special concern species

T=threatened species

Blank=identification has not been verified

Note that the state status for the Least Flycatcher was erroneously reported as "SS." The correct designation is "SC" per conversation between Brian Gillen (Malcolm Pirnie, Inc.) and a NJDEP representative on January 18, 2008.

* = Species that could potentially utilize the Lower Passaic River or its tributaries at some stage in their lives.

Table 2-2: Aquatic Birds Sightings in 1999-2000 from RM1 to RM7

Dominant Species ^{a,b}	Percent of Aquatic Bird Sightings
Herring Gull (<i>Larus argentatus</i>)	19
Laughing Gull (<i>Larus atricilla</i>)	15
Ring-billed Gull (<i>Larus delawarensis</i>)	13
Mallard (<i>Anas platyrhynchos</i>)	10
Double-crested Cormorant (<i>Phalacrocorax auritus</i>)	8
Greater Black-backed Gull (<i>Larus marinus</i>)	8
Great Egret (<i>Casmerodius albus</i>)	6

a: Data source: BBL, 2002 as cited in Battelle, 2005.

b: The most commonly observed aquatic birds species are listed in this table; the remaining 21 percent are less frequently observed species.

Table 2-3: Fish Species Collected in Newark Bay During the 1993-1994 and 1995-1996 Sampling Events

Common Name	Species
Little Skate	<i>Raja erinacea</i>
Atlantic Sturgeon	<i>Acipenser oxyrhincus</i>
American Eel	<i>Anguilla rostrata</i>
Conger Eel	<i>Conger oceanicus</i>
Blueback Herring	<i>Alosa aestivalis</i>
Alewife	<i>Alosa pseudoharengus</i>
American Shad	<i>Alosa sapidissima</i>
Atlantic Menhaden	<i>Brevoortia tyrannus</i>
Atlantic Herring	<i>Clupea harengus</i>
Gizzard Shad	<i>Dorosoma epedianum</i>
Anchovies	<i>Engraulidae</i>
Bay Anchovy	<i>Anchoa mitchilli</i>
Striped Anchovy	<i>Anchoa hepsetus</i>
Rainbow Smelt	<i>Osmerus mordax</i>
Atlantic Tomcod	<i>Microgadus tomcod</i>
Red Hake	<i>Urophycis chuss</i>
Spotted Hake	<i>Urophycis regia</i>
Striped Killifish	<i>Fundulus majalis</i>
Atlantic Silverside	<i>Menidia menidia</i>
Threespine Stickleback	<i>Gasterosteus aculeatus</i>
Lined Seahorse	<i>Hippocampus erectus</i>
Northern Pipefish	<i>Syngnathus fuscus</i>
Grubby	<i>Myoxocephalus aeneus</i>
White Perch	<i>Morone americana</i>
Striped Bass	<i>Morone saxatilis</i>
Bluefish	<i>Pomatomus saltatrix</i>
Crevalle Jack	<i>Caranx hippos</i>
Scup	<i>Stenotomus chrysops</i>
Weakfish	<i>Cynoscion regalis</i>
Spot	<i>Leiostomus xanthurus</i>
Northern Kingfish	<i>Menticirrhus saxatilis</i>
Silver Perch	<i>Bairdiella chrysura</i>
Atlantic Croaker	<i>Micropogon undulatas</i>
Tautog	<i>Tautoga onitis</i>
Cunner	<i>Tautoglabrus adspersus</i>
Rock Gunnel	<i>Pholis gunnellus</i>
Chub Mackerel	<i>Scomber japonicus</i>
Atlantic Butterfish	<i>Peprilus triacanthus</i>
Smallmouth Flounder	<i>Etropus microstomus</i>
Summer Flounder	<i>Paralichthys dentatus</i>
Winter Flounder	<i>Pseudopleuronectes americanus</i>

Data Source: USACE (2007).

Table 2-4: Benthic Invertebrate Communities in 2005 from RM0 to RM16.5

Dominant Species at Mouth of River (RM -0.5) ^a	Percent of Benthic Observed
<i>Scoloplos</i> sp	83 percent
Naididae Oligochaetes	7 percent
<i>Streblospio benedicti</i>	4 percent
<i>Travisia carnea</i>	4 percent
<i>Nereis succinea</i>	2 percent
Dominant Species at RM4 ^a	Percent of Benthic Observed
Naididae Oligochaetes	49 percent
<i>Marenzelleria viridis</i>	32 percent
<i>Gammarus</i> sp.	15 percent
<i>Glycera</i> sp.	2 percent
Mysidacea	2 percent
Dominant Species at RM6.5 ^a	Percent of Benthic Observed
Naididae Oligochaetes	81 percent
Gammaridean amphipods	17 percent
<i>Marenzelleria viridis</i>	2 percent
<i>Chiridotea almyra</i>	<1 percent
Dominant Species at RM11 ^a	Percent of Benthic Observed
Naididae Oligochaetes	76 percent
Chironimidae	23 percent
<i>Placobdella</i>	1 percent
Dominant Species at RM15 ^a	Percent of Benthic Observed
Chironimidae	39 percent
<i>Hydra</i> sp.	28 percent
Gammaridean amphipods	16 percent
Oligochatea	8 percent
<i>Placobdella</i>	4 percent
<i>Asellus</i> sp., Diptera pupae, Sphaeriidae, and <i>Manayunkia speciosa</i>	5 percent
Dominant Species at RM16.5 ^a	Percent of Benthic Observed
Chironimidae	92 percent
Culicidae	5 percent
<i>Gammarus</i> sp.	3 percent

a: Data source: Aqua Survey, Inc., 2005 and Germano & Associates, Inc., 2005.

Table 2-5: Lower Passaic River Authorized Dimensions of the Federal Navigational Channel and Periods of Dredging

River Mile ^a	Channel Depth (feet) ^{b, c}	Channel Width (feet)	Years Dredged ^d
RM -0.2 to RM2.2	30	300	1907, 1911, 1912, and 1930 (USEPA, 1995) 1940, 1946, 1957, 1965, and 1971 (IT Corporation, 1986) 1884, 1917, 1921, 1922, 1932, 1933, 1941, 1946, 1951, 1953, 1957, 1962, 1965, 1971, 1972, 1977, and 1983 (Iannuzzi <i>et al.</i> , 2002)
RM2.2 to RM4.3	20	300	1949 (USEPA, 1995) 1884, 1916, 1921, and 1937 (Iannuzzi <i>et al.</i> 2002)
RM4.3 to RM6.9	20 (only constructed to 16 feet)	300	1949, 1950 (USEPA, 1995) 1913, 1919, 1933, and 1950 (Iannuzzi <i>et al.</i> 2002)
RM6.9 to RM7.9	16	200	1950 (USEPA, 1995) 1874, 1876, 1878, 1879, 1883, 1899, 1906, 1915, 1916, 1927, 1929, 1930, 1931, 1932, 1934, 1938, 1939, 1940, 1945, 1949, and 1956 (Iannuzzi <i>et al.</i> 2002)
RM7.9 to RM15.2	10	200	Record of dredge maintenance not available

a: River miles are referenced to the centerline river mile scale. These river miles are offset from the scale that is used by the USACE by approximately 0.2 miles.

b: Obtained from the “Report of Channel Conditions 100 to 400 feet Wide” (USACE, 2002) and the USACE map “Newark Bay, Hackensack & Passaic Rivers, N.J. (Passaic River)” dated September 30, 1986.

c: Channel depth is relative to mean low water (MLW).

d: Years listed represent periods of dredging as given in the associated citation. The year in bold indicates the last documented period of dredging.

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Chapter 3 Tables

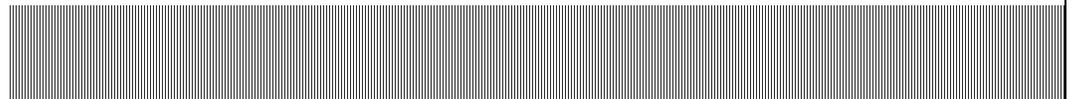


Table 3-1: Historical and Current Datasets Incorporated into the Comprehensive CSM

Year	Data Source Name	Approved QAPP or Work Plan	Data Validated
<i>GIS Layers</i>			
1995	Chromate Waste Sites, NJDEP	Not Applicable	Not Applicable
1999	NJDEP Wetlands, NJDEP	Not Applicable	Not Applicable
2001	Habitat, NJDEP Division of Fish and Wildlife	Not Applicable	Not Applicable
2002	Land Use, NJDEP	Not Applicable	Not Applicable
2003	Toxic Release Inventory Facilities, USEPA	Not Applicable	Not Applicable
2004	National Priority List Sites, USEPA	Not Applicable	Not Applicable
2005	Known Contaminated Site List, NJDEP	Not Applicable	Not Applicable
2006	Soils, NRCS and USDA	Not Applicable	Not Applicable
2005-2007	FEMA Flood Zones, FEMA DFIRM Database	Not Applicable	Not Applicable
2007	NWI Wetlands, National Wetland Inventory Dataset	Not Applicable	Not Applicable
2007	Bedrock Geology, NJGS and NJDEP	Not Applicable	Not Applicable
<i>Tissue</i>			
1993	NYSDEC 1993	Yes	Yes
1994	NYSDEC 1994	Yes	Yes
1995	1995 TSI Biological Sampling Program	Unknown	Yes
1999	1999 TSI Late Summer/Early Fall Ecological Sampling Plan (ESP) Sampling Program (USEPA oversight)	Yes	Yes
2000	2000 TSI Spring ESP Sampling Program (USEPA oversight)	Yes	Yes
<i>Sediment</i>			
1991	1991 TSI Core Sediment Investigation	No	Yes
1993	NOAA NS&T Hudson-Raritan Phase II- 1993	No	No
1993	1993 TSI Core Sediment Investigation - 01 (March)	No	No
1993	1993 TSI Core Sediment Investigation - 02 (July)	No	No
1995	1995 TSI Remedial Investigation Sampling Program (USEPA oversight)	Yes	Yes
1999	1999 TSI Late Summer/Early Fall Environmental Sampling Program (USEPA oversight)	Yes	Yes
1999/2000	1999/2000 USACE Minish Park Monitoring Program	Yes	No
2000	2000 TSI Spring Environmental Sampling Program (USEPA oversight)	Yes	Yes
2005-2006	2005-2006 USEPA Sampling Program (Malcolm Pirnie, Inc.) Low Resolution Cores	Yes	Yes
2005-2006	2005-2006 USEPA Sampling Program (Malcolm Pirnie, Inc.) High Resolution Cores	Yes	Yes
2005	2005 TSI Newark Bay Phase I Remedial Investigation Work Plan Dataset	Yes	Yes
2007-2008	2007-2008 USEPA Empirical Mass Balance Evaluation Sampling Program (Malcolm Pirnie, Inc.)	Yes	Yes
<i>Hydrodynamics</i>			
2004-2005	November 2004 to September 2005 USEPA (Malcolm Pirnie, Inc.) Survey	Yes	Not Applicable
2004-2005	November 2004 to January 2005 Rutgers Survey Second Deployment	Yes	Not Applicable

Table 3-1: Historical and Current Datasets Incorporated into the Comprehensive CSM

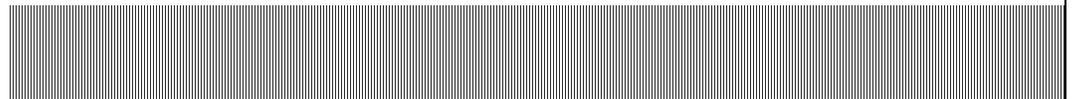
2005	July to September 2005 Rutgers Survey Third Deployment		Yes	Not Applicable
Date	Survey Company	Survey Extent (RM) ^a	Approved QAPP or Work Plan	Data Validated
<i>Bathymetry</i>				
1989	November 1989 Topo-Metrics, Inc. for USACE	0 to 15	Not Applicable	Not Applicable
1995	March/April 1995 Ocean Surveys, Inc. for TSI	0.5 to 8.2	Not Applicable	Not Applicable
1996	November 1996 Ocean Surveys, Inc. for TSI	0.5 to 6.94	Not Applicable	Not Applicable
1997	April 1997 Ocean Surveys, Inc. for TSI	0.5 to 6.94	Not Applicable	Not Applicable
1999	June 1999 Ocean Surveys, Inc. for TSI	0.9 to 6.94	Not Applicable	Not Applicable
2001	August 2001 Ocean Surveys, Inc. for TSI	0.9 to 6.94	Not Applicable	Not Applicable
2002	July 2002 TVGA Consultants for USACE	0 to 8.0	Not Applicable	Not Applicable
2004	November 2004 Rogers Surveying, Inc. for USACE	0 to 17.4	Not Applicable	Not Applicable
2007	August to September 2007 Gahagan & Bryant Associates, Inc. for Cooperating Party Group	0 to 14.5	Not Applicable	Not Applicable

a: The original vertical datum for surveys was MLW as defined by the USACE. The transect density for the surveys was approximately 52 transects per mile.

b: The validation status of the historical sediment and tissue datasets was reported in the "Passaic River Study Area RI/FS Database PRSA version 4."

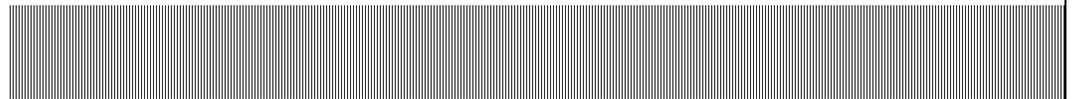
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Section III



Chapter 4 Tables

There are no tables associated with this chapter.



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Chapter 5 Tables

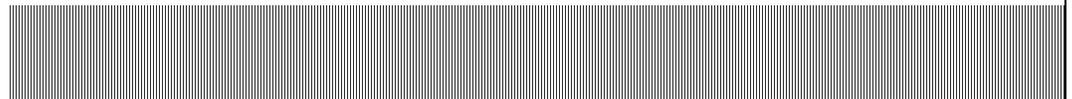


Table 5-1: Flow Statistics for the Little Falls USGS Gauging Station

Year ^a	Annual Average River Flow (cfs) ^b	Annual Peak River Flow (cfs) ^b
1995	483	2,850
1996	1,420	9,270
1997	1,400	8,090
1998	1,180	8,840
1999	679	11,300
2000	950	3,140
2001	822	4,450
2002	199	2,020
2003	1,530	6,840
2004	1,510	7,210
2005	1,210	11,700
Average from 1995 to 2005	1,030	6,880
Average from 1956 to 2005	1,050	7,180
Minimum from 1956 to 2005	199	2,020
Maximum from 1956 to 2005	2,010	18,000

a: "Year" is defined as a "water year," which extends from October 1 through September 30. For example, the 1995 water year extends from October 1, 1994 through September 30, 1995.

b: Data source: USGS National Water Information System

(http://waterdata.usgs.gov/nwis/dv/?referred_module=sw. Site last accessed February 2, 2007). The site is 01389500 Passaic River (Little Falls, New Jersey).

Table 5-2: Upper Passaic River Contaminant Concentrations

Sample ID	Field Name	2,3,7,8-TCDD	Total TCDD	Aldrin	Dieldrin	Total Chlordane (cis & trans)	Total DDT (4,4'-DDD, 4,4'-DDE, and 4,4'-DDT)	Total Endrin (Endrin Ketone, Endrin and Endrin aldehyde)	Benzo[a]pyrene	Chrysene	Fluoranthene
LPRP-LVCG-DDL-000004	Ackerman/Dundee Lake	0.00461	0.00461	3.00431	49.56897	268	133	1.29	10,776	13,836	19,138
LPRP-LVCG-DDL-000006	Ackerman/Dundee Lake	0.00398	0.00398	2.654206	72.7	248	121	1.69	7,925	11,477	15,570
LPRP-SCSH-DDL-000018	Dundee Core 2	0.00195	0.00195	1.66	4.3	92.3	91.4		7,130	8,190	10,800
LPRP-SCSH-DDL-000068	Dundee Core 6	0.00194	0.00194	0.831	3.15	41.9	37.1		3,470	3,970	7,030
LPRP-SCSH-DDL-000143	Bopp PASS8B, Slice 1, 0-2 cm	0.00102	0.00102	0.442	3.8	31.2	22.2	0.062	5,080	5,990	8,640
LPRP-SCSH-DDL-000153	Bopp PASS8BP, Slice 1, 0-2 cm	0.00161	0.00161	1.51	3.08	38.8	25.3	0.032	5,770	6,290	9,180
LPRP-SCSH-PSR-001579	SurSed Dundee-2										
LPRP-SCSH-PSR-001589	SurSed Dundee-4										
LPRP-SCSH-PSR-001590	SurSed Dundee-3	0.00292	0.00292	0.924	4.31	41.3	29.5	0.031	5,900	6,780	8,300
LPRP-SCSH-PSR-001602	SurSed Dundee-1	0.00143	0.00143	0.734	3.32	28.5	24.8	0.051	4,720	5,150	7,550
LPRP-SCSH-PSR-001604	SurSed Dundee-1 Dup	0.00282	0.00282	1.18	6.03	51.9	39.9	0.074	9,750	10,400	16,200
LPRP-SCSH-PSR-001607	PSR SedTrap#1	0.00155	0.00155	0.723	11.2	51.7	38.6	0.297	5,210	6,010	8,480
LPRP-SCSH-PSR-001663	PSR SedTrap#2	0.00156	0.00156	0.541	12	54.7	34.6	0.39	3,730	4,390	5,950

Sample ID	Field Name	Pyrene	High Molecular PAH	Low Molecular PAH	Total PAHs	Total PCBs	Aluminum	Arsenic	Cadmium	Chromium	Copper
LPRP-LVCG-DDL-000004	Ackerman/Dundee Lake	17,069	113,388	11,766	125,154	536	48,826,291	15,493	3,521	114,554	333,803
LPRP-LVCG-DDL-000006	Ackerman/Dundee Lake	14,206	90,026	9,486	99,512	373	37,469,586	23,601	5,815	116,545	338,200
LPRP-SCSH-DDL-000018	Dundee Core 2	11,200	65,130	9,352	74,482	1,475	7,850,000	4,300	2,200	33,700	80,000
LPRP-SCSH-DDL-000068	Dundee Core 6	6,640	35,869	5,201	41,070	587	6,350,000	2,000	1,800	23,200	67,800
LPRP-SCSH-DDL-000143	Bopp PASS8B, Slice 1, 0-2 cm	8,830	52,726	7,072	59,798	283		2,701	1,443	46,033	61,571
LPRP-SCSH-DDL-000153	Bopp PASS8BP, Slice 1, 0-2 cm	8,930	57,957	6,409	64,366	711		3,781	1,944	51,380	78,630
LPRP-SCSH-PSR-001579	SurSed Dundee-2						8,480,000	2,900	1,500	30,900	70,300
LPRP-SCSH-PSR-001589	SurSed Dundee-4						6,370,000	2,300	1,100	25,200	58,600
LPRP-SCSH-PSR-001590	SurSed Dundee-3	8,710	52,456	6,030	58,486	428	7,260,000	2,500	1,300	24,700	55,100
LPRP-SCSH-PSR-001602	SurSed Dundee-1	7,490	43,395	7,240	50,635	236	6,870,000	2,400	950	21,700	43,700
LPRP-SCSH-PSR-001604	SurSed Dundee-1 Dup	15,400	87,240	16,713	103,953	519	6,120,000	3,200	1,000	20,600	48,900
LPRP-SCSH-PSR-001607	PSR SedTrap#1	8,250	48,672	7,230	55,902	263	8,710,000	3,600	1,600	31,100	70,000
LPRP-SCSH-PSR-001663	PSR SedTrap#2	6,170	35,503	5,714	41,217	220	6,160,000	2,300	1,700	31,100	56,200

Sample ID	Field Name	Iron	Lead	Mercury	Nickel
LPRP-LVCG-DDL-000004	Ackerman/Dundee Lake	61,971,831	497,653	765	70,423
LPRP-LVCG-DDL-000006	Ackerman/Dundee Lake	66,180,049	513,382	601	68,613
LPRP-SCSH-DDL-000018	Dundee Core 2	17,800,000	142,000	720	21,000
LPRP-SCSH-DDL-000068	Dundee Core 6	17,100,000	163,000	1,000	19,300
LPRP-SCSH-DDL-000143	Bopp PASS8B, Slice 1, 0-2 cm	23,415,565	137,847	590	21,893
LPRP-SCSH-DDL-000153	Bopp PASS8BP, Slice 1, 0-2 cm	23,146,324	136,161	570	26,533
LPRP-SCSH-PSR-001579	SurSed Dundee-2	15,100,000	138,000	660	20,100
LPRP-SCSH-PSR-001589	SurSed Dundee-4	12,500,000	108,000	460	14,900
LPRP-SCSH-PSR-001590	SurSed Dundee-3	13,000,000	119,000	740	16,400
LPRP-SCSH-PSR-001602	SurSed Dundee-1	13,200,000	87,100	500	14,000
LPRP-SCSH-PSR-001604	SurSed Dundee-1 Dup	12,400,000	102,000	430	17,700
LPRP-SCSH-PSR-001607	PSR SedTrap#1	16,700,000	150,000	1,800	19,100
LPRP-SCSH-PSR-001663	PSR SedTrap#2	13,700,000	139,000	470	15,400

Note: All units are in micrograms per kilogram.

Table 5-3: Summary Statistics for Upper Passaic River Contaminant Concentrations

Analysis Columns	Unit	N	Min	Max	Mean	Median	Std Dev	CV (%)
2,3,7,8-TCDD	ng/kg	11	1.02	4.61	2.31	1.94	1.14	50
Total Tetra-dioxins	ng/kg	11	16	73	40	34	18	44
Ratio 2,3,7,8-TCDD/Total-TCDD		11	0.03	0.25	0.07	0.05	0.06	91
PCB 24+27	ug/kg	11	0.32	13	1.99	0.68	3.74	188
PCB 31	ug/kg	11	3.33	31	9.55	7.03	8.16	85
PCB 50+53	ug/kg	11	1.00	9.19	2.68	1.79	2.36	88
PCB 52+69	ug/kg	11	6.52	49	15	12	12	84
PCB 61+70+74+76+66	ug/kg	11	9.01	113	29	19	29	103
PCB 83+99	ug/kg	11	4.51	31	9.92	7.78	7.64	77
PCB 90+101+113	ug/kg	11	7.64	51	18	14	12	70
PCB 93+95+98+100+102	ug/kg	11	6.17	45	15	12	11	74
PCB 110+115+111	ug/kg	11	9.28	53	20	18	12	61
PCB 129+138+158+160+163+164	ug/kg	11	12	67	27	25	16	61
PCB 139+140+149+147	ug/kg	11	8.05	50	18	16	12	68
PCB 170	ug/kg	11	2.37	16	5.67	4.52	4.02	71
PCB 180+193	ug/kg	11	5.49	41	14	11	10	76
PCB 196+203	ug/kg	11	2.08	14	5.08	5.08	3.42	67
Total PCBs	ug/kg	11	220	1,475	512	428	357	70
Acenaphthene	mg/kg	11	0.26	0.91	0.47	0.40	0.20	43
Acenaphthylene	mg/kg	11	0.27	1.32	0.70	0.69	0.29	42
Anthracene	mg/kg	11	0.68	2.36	1.14	0.98	0.46	40
Fluorene	mg/kg	11	0.23	0.80	0.37	0.36	0.16	44
Naphthalene	mg/kg	10	0.29	1.12	0.56	0.49	0.23	40
Phenanthrene	mg/kg	11	3.15	10	5.19	4.43	2.18	42
Benz[a]anthracene	mg/kg	11	3.02	8.52	4.91	4.72	1.60	33
Benzo[a]pyrene	mg/kg	11	3.47	11	6.31	5.77	2.36	37
Benzo[g,h,i]perylene	mg/kg	11	2.22	9.40	4.36	3.49	2.28	52
Benzo[j,k]fluoranthene	mg/kg	11	3.25	13	6.17	5.02	3.05	49
Benzo[j]fluoranthene	mg/kg	11	2.98	12	6.48	5.87	3.09	48
Chrysene	mg/kg	11	3.97	14	7.50	6.29	3.15	42
Dibenz[a,h]anthracene	mg/kg	11	0.66	1.52	1.05	0.98	0.31	29
Fluoranthene	mg/kg	11	5.95	19	11	8.64	4.34	41
Indeno[1,2,3-c,d]-pyrene	mg/kg	11	2.33	9.27	4.36	3.61	2.19	50
Pyrene	mg/kg	11	6.17	17	10	8.83	3.70	36
Low Molecular PAHs	mg/kg	11	5.20	17	8.38	7.23	3.38	40
High Molecular PAHs	mg/kg	11	36	113	62	53	25	40
Total PAHs	mg/kg	11	41	125	70	60	28	39
4,4'-DDD	ug/kg	11	11	59	22	17	15	66
4,4'-DDE	ug/kg	11	7.54	38	17	13	10	61
4,4'-DDT	ug/kg	11	2.79	62	16	5.46	22	141
Aldrin	ug/kg	11	0.44	3.00	1.29	0.92	0.85	66
Dieldrin	ug/kg	10	3.08	50	10	4.31	14	142
Chlordane,gamma (trans)	ug/kg	11	14	124	41	24	40	98
Arsenic	mg/kg	13	2.00	18	4.85	2.90	4.90	101
Cadmium	mg/kg	13	0.95	4.47	1.84	1.60	0.95	52
Chromium	mg/kg	13	21	103	41	31	26	64
Cobalt	mg/kg	13	6.00	17	9.87	8.70	3.28	33
Copper	mg/kg	13	44	260	89	68	65	73
Iron	mg/kg	13	12,400	52,586	21,653	16,700	13,833	64
Lead	mg/kg	13	87	394	165	138	91	55
Mercury	mg/kg	13	0.43	1.80	0.70	0.59	0.37	52
Nickel	mg/kg	13	14	57	24	19	14	57
Zinc	mg/kg	11	211	802	366	269	201	55
Total Organic Carbon	mg/kg	11	24,000	157,000	57,945	36,600	49,042	85

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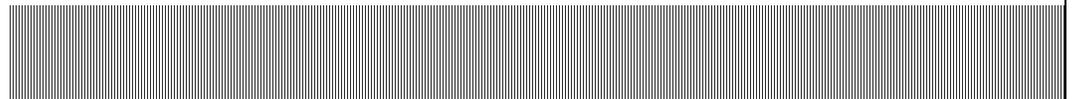


Table 6-1: Average Newark Bay Recently Deposited Surface Sediment Concentrations for Select Contaminants

Analyte	Average Northern Concentration ^a	Average Southern Concentration ^b
Mercury (mg/kg)	2.2	0.93
Lead (mg/kg)	110	77
Cadmium (mg/kg)	1.2	0.64
Trans-Chlordane (µg/kg)	NA	26
DDE (µg/kg)	32	18
2,3,7,8-TCDD (ng/kg)	77	16
Total TCDD (ng/kg)	160	54
BZ 31 (µg/kg)	21	12
BZ 52 (µg/kg)	20	7.4
BZ 61+66+70+74+76 (µg/kg)	46	19
BZ 83+99 (µg/kg)	10	4.3
BZ 90+101+113 (µg/kg)	19	7.8
BZ 93+95+98+100+102 (µg/kg)	16	5.8
BZ 110+111+115 (µg/kg)	22	9.3
BZ 129+138+158+160+163+164 (µg/kg)	18	7.4
BZ 139+140+147+149 (µg/kg)	16	6.0
BZ 170 (µg/kg)	3.8	1.5
BZ 180+193 (µg/kg)	11	4.2
Benz[a]anthracene (mg/kg) ^c	1.3	0.35
Benzo[a]pyrene (mg/kg) ^c	1.7	0.40
Chrysene (mg/kg) ^c	1.4	0.37
Fluoranthene (mg/kg) ^c	1.9	0.51
Indeno[1,2,3-cd]pyrene (mg/kg) ^c	0.92	0.31
Pyrene (mg/kg) ^c	2.4	0.58

a: Northern Newark Bay sampling locations represent recently deposited surface sediments between RM-0.45 and RM-1.9.

b: Southern Newark Bay sampling locations represent recently deposited surface sediments between RM-3.0 and RM-4.6.

c: One elevated PAH concentration at RM-4.1 was excluded from the average southern concentration. Concentrations rounded to two significant figures.

Table 6-2: Trans-Chlordane Concentrations in 1985 Surficial Sediment

Bopp <i>et al.</i> (1991) Location Identification Number	Approximate River Mile (relative to mouth of river) ^a	Trans-Chlordane Concentration (µg/kg)
NB11	-0.5	15
NB12	-0.5	32
NB13	-1.4	15
NB16	-2.8	19
NB19	-3.5	52
NB10	-4.5	14
NB18	-5.0	32

a: River miles for the Newark Bay sampling locations are assigned with respect to the distance from the mouth of the Lower Passaic River (RM0.0) and follow the federal navigation channel.

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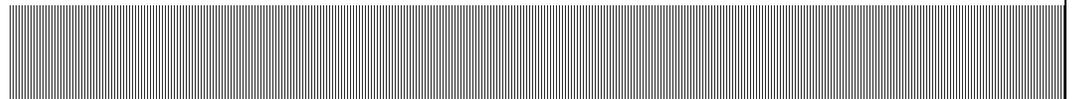


Table 7-1: Estimated Solids Load and Watershed Area to the Lower Passaic River

Source to the Lower Passaic River	Solids Load ^a	Watershed Area
	(cubic yards/year)	(square miles)
Dundee Dam	73,000	810
Saddle River	4,100	60
Third River	850	13
Second River	990	15
CSO/SWOs (ungauged)	2,800	43

a: Solids loads differ from the values reported in the original CSM because adjustments were made here to consider the additional watershed area between the USGS gauging station and the confluence with the Lower Passaic River.

Values were rounded to two significant figures.

Table 7-2: 2007-2008 Tributary Boundary Sampling Statistics Results

Analytes	Unit	All Tributaries						
		N	Min	Max	Mean	Median	Std Dev	CV (%)
2,3,7,8-TCDD	ng/kg	17	0.16	12	3.10	1.83	3.23	104
Total PCBs	ug/kg	17	52	1,373	906	1,044	424	47
Total PAHs	mg/kg	17	29	788	149	57	211	141
4,4'-DDD	ug/kg	17	8.47	208	67	51	53	79
4,4'-DDE	ug/kg	17	13	445	71	41	101	143
4,4'-DDT	ug/kg	17	18	785	129	73	180	140
Aldrin	ug/kg	17	0.19	7.71	1.95	1.39	1.95	100
Dieldrin	ug/kg	17	6.00	134	42	23	41	97
Chromium	mg/kg	20	15	107	44	36	29	65
Mercury	mg/kg	20	0.06	1.84	0.44	0.30	0.43	97

Table 7-2: 2007-2008 Tributary Boundary Sampling Statistics Results

Analytes	Unit	Saddle River						
		N	Min	Max	Mean	Median	Std Dev	CV (%)
2,3,7,8-TCDD	ng/kg	6	0.23	7.91	3.28	1.84	3.20	98
Total PCBs	ug/kg	6	52	1,373	906	1,034	451	50
Total PAHs	mg/kg	6	32	788	188	59	298	159
4,4'-DDD	ug/kg	6	8.47	62	26	19	20	77
4,4'-DDE	ug/kg	6	13	80	38	24	31	80
4,4'-DDT	ug/kg	6	18	124	58	33	50	86
Aldrin	ug/kg	6	0.56	7.71	2.63	1.28	2.83	108
Dieldrin	ug/kg	6	15	103	45	29	37	82
Chromium	mg/kg	9	15	104	39	21	32	82
Mercury	mg/kg	9	0.06	0.41	0.17	0.12	0.12	70

Table 7-2: 2007-2008 Tributary Boundary Sampling Statistics Results

Analytes	Unit	Second River						
		N	Min	Max	Mean	Median	Std Dev	CV (%)
2,3,7,8-TCDD	ng/kg	5	0.16	12	3.30	1.76	5.14	156
Total PCBs	ug/kg	5	78	1,373	704	852	579	82
Total PAHs	mg/kg	5	29	541	151	48	220	146
4,4'-DDD	ug/kg	5	30	208	81	51	73	90
4,4'-DDE	ug/kg	5	21	445	115	32	185	161
4,4'-DDT	ug/kg	5	64	785	226	73	314	139
Aldrin	ug/kg	5	0.19	5.02	1.70	1.08	1.91	113
Dieldrin	ug/kg	5	6.00	134	34	8.99	56	164
Chromium	mg/kg	5	20	107	52	41	37	71
Mercury	mg/kg	5	0.24	0.88	0.52	0.46	0.29	56

Table 7-2: 2007-2008 Tributary Boundary Sampling Statistics Results

Analytes	Unit	Third River						
		N	Min	Max	Mean	Median	Std Dev	CV (%)
2,3,7,8-TCDD	ng/kg	6	1.66	4.96	2.75	2.20	1.32	48
Total PCBs	ug/kg	6	852	1,373	1,075	1,056	169	16
Total PAHs	mg/kg	6	47	317	109	59	106	97
4,4'-DDD	ug/kg	6	46	129	97	99	32	33
4,4'-DDE	ug/kg	6	35	120	67	54	34	51
4,4'-DDT	ug/kg	6	28	222	120	128	84	70
Aldrin	ug/kg	6	0.59	2.45	1.49	1.45	0.65	44
Dieldrin	ug/kg	6	7.68	100	46	41	38	82
Chromium	mg/kg	6	27	72	47	39	19	42
Mercury	mg/kg	6	0.29	1.84	0.79	0.64	0.57	73

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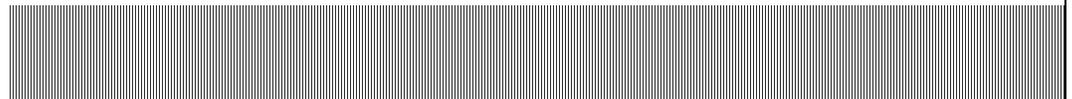


Table 8-1: CSO Locations Sampled during 2007-2008 Sampling Event

City	Location	River Mile	Total Acres	Percentage of Land Use			
				Residential	Open Space	Industrial	Commercial
Newark	Freeman Street CSO	3.89	116	42		58	
Newark	Saybrook Place/Rector Street CSO	5.16	415	28	2	12	58
Newark	Clay Street CSO	5.77	1739	50	19	6	24
Newark	Fourth Avenue CSO	6.18	200	51	4	10	35
Newark	Verona Ave CSO	7.77	370	57		21	14

Source: Table provided by PVSC; Table 5 City of Newark Land Use Distribution

Table 8-2: SWO Locations Sampled during 2007-2008 Sampling Event

City	Location	River Mile
Newark	Blanchard Street SWO	2.68
Kearny	Johnston Avenue SWO	6.08
Belleville	Little Street and Davidson Street SWO	9.23
North Arlington	River Road and Crystal Street SWO	9.32
Lyndhurst	Riverside County Park SWO	9.64
Lyndhurst	Copeland and Riverside Avenue SWO	10.31
Nutley	Park Avenue Bridge SWO	10.39
Lyndhurst	Tontine & Riverside Avenue SWO	11.15

Table 8-3: Summary Statistics of CSO Samples Collected in 2007-2008

Class	Analyte	Unit	N	Min	Max	Mean	Median	Std Dev	CV (%)
Dioxins	2,3,7,8-TCDD	ng/kg	14	0.31	24	4.09	2.29	6.19	152
	Total Tetra-dioxins	ng/kg	14	2.03	527	68	16	141	208
PCBs	PCB 24+27	ug/kg	14	0.00	1.99	0.67	0.03	0.91	137
	PCB 31	ug/kg	14	0.02	30	10	0.41	14	136
	PCB 50+53	ug/kg	14	0.01	7.90	2.15	0.06	3.15	146
	PCB 52+69	ug/kg	14	0.04	43	12	0.49	17	141
	PCB 61+70+74+76+66	ug/kg	14	0.08	119	27	1.13	41	150
	PCB 83+99	ug/kg	14	0.04	38	7.69	0.31	12	158
	PCB 90+101+113	ug/kg	14	0.06	51	12	0.61	17	151
	PCB 93+95+98+100+102	ug/kg	14	0.06	36	9.26	0.49	14	147
	PCB 110+115+111	ug/kg	14	0.08	52	12	0.81	18	146
	PCB 129+138+158+160+163+164	ug/kg	14	0.09	59	15	1.14	21	143
	PCB 139+140+149+147	ug/kg	14	0.06	46	11	0.54	17	149
	PCB 170	ug/kg	14	0.02	11	3.36	0.24	4.76	142
	PCB 180+193	ug/kg	14	0.04	27	8.01	0.60	11	142
	PCB 196+203	ug/kg	14	0.01	9.52	2.94	0.23	3.95	134
Total PCBs	ug/kg	14	1.50	1,373	360	20	510	142	
PAHs	Acenaphthene	mg/kg	14	0.00	0.74	0.26	0.24	0.22	85
	Acenaphthylene	mg/kg	14	0.00	0.41	0.17	0.17	0.13	75
	Anthracene	mg/kg	14	0.00	1.82	0.48	0.53	0.46	96
	Fluorene	mg/kg	14	0.02	2.19	0.53	0.42	0.56	106
	Naphthalene	mg/kg	14	0.01	0.95	0.33	0.36	0.28	86
	Phenanthrene	mg/kg	14	0.00	11	3.12	2.79	3.22	103
	Benz[a]anthracene	mg/kg	14	0.23	4.88	1.74	1.71	1.32	76
	Benzo[a]pyrene	mg/kg	14	0.20	4.68	2.03	2.09	1.45	71
	Benzo[g,h,i]perylene	mg/kg	14	0.23	4.41	2.20	2.53	1.50	68
	Benzo[j,k]fluoranthene	mg/kg	14	0.20	4.69	2.39	2.71	1.68	70
	Benzo[j]fluoranthene	mg/kg	14	0.29	6.50	2.90	3.31	2.03	70
	Chrysene	mg/kg	14	0.42	8.36	3.56	3.98	2.57	72
	Dibenz[a,h]anthracene	mg/kg	14	0.04	0.93	0.43	0.47	0.30	69
	Fluoranthene	mg/kg	14	0.69	14	5.37	6.00	4.02	75
	Indeno[1,2,3-c,d]-pyrene	mg/kg	14	0.22	3.93	1.99	2.26	1.30	65
	Pyrene	mg/kg	14	0.69	15	5.23	5.30	3.97	76
	Low Molecular PAHs	mg/kg	14	0.04	17	4.91	4.27	4.62	94
	High Molecular PAHs	mg/kg	14	3.54	67	28	31	20	71
Total PAHs	mg/kg	14	3.66	84	33	35	24	74	
Pesticides	4,4'-DDD	ug/kg	14	1.66	24	13	12	8.42	64
	4,4'-DDE	ug/kg	14	5.64	52	24	21	14	60
	4,4'-DDT	ug/kg	13	10	162	58	45	41	70
	Aldrin	ug/kg	14	0.01	0.88	0.28	0.17	0.27	96
	Dieldrin	ug/kg	14	3.50	32	11	11	8.31	73
	Chlordane,gamma (trans)	ug/kg	13	6.98	74	31	26	21	69
Metals	Arsenic	mg/kg	12	4.26	11	7.42	6.78	2.07	28
	Cadmium	mg/kg	13	0.37	8.74	2.15	1.23	2.36	110
	Chromium	mg/kg	12	8.38	227	67	59	57	85
	Cobalt	mg/kg	13	1.33	22	8.36	6.94	5.71	68
	Copper	mg/kg	13	106	861	316	279	182	58
	Iron	mg/kg	13	4,814	52,700	22,326	18,824	13,245	59
	Lead	mg/kg	13	80	1,398	383	350	341	89
	Mercury	mg/kg	14	0.30	3.34	1.02	0.92	0.72	71
	Nickel	mg/kg	13	9.42	200	50	42	48	97
Zinc	mg/kg	13	276	2,439	874	848	527	60	

Note:

Data associated with a laboratory qualifier containing a "U" were considered to be not detected and were set to be half of method detection limit.

Table 8-4: Summary Statistics of SWO Samples Collected in 2007-2008

Class	Analyte	Unit	N	Min	Max	Mean	Median	Std Dev	CV (%)
Dioxins	2,3,7,8-TCDD	ng/kg	16	0.62	105	20	8.87	31	153
	Total Tetra-dioxins	ng/kg	16	8.54	1,234	116	32	300	259
PCBs	PCB 24+27	ug/kg	16	0.01	2.42	1.07	1.19	0.96	90
	PCB 31	ug/kg	16	0.07	37	16	19	15	93
	PCB 50+53	ug/kg	16	0.01	9.69	4.02	4.11	3.81	95
	PCB 52+69	ug/kg	16	0.13	54	22	24	20	93
	PCB 61+70+74+76+66	ug/kg	16	0.30	123	51	51	48	95
	PCB 83+99	ug/kg	16	0.11	38	14	14	14	95
	PCB 90+101+113	ug/kg	16	0.19	54	22	23	21	92
	PCB 93+95+98+100+102	ug/kg	16	0.17	46	19	20	17	93
	PCB 110+115+111	ug/kg	16	0.30	57	24	26	21	90
	PCB 129+138+158+160+163+164	ug/kg	16	0.46	74	29	32	27	90
	PCB 139+140+149+147	ug/kg	16	0.22	57	22	24	21	93
	PCB 170	ug/kg	16	0.10	19	6.84	7.29	6.43	94
	PCB 180+193	ug/kg	16	0.26	46	17	17	16	94
	PCB 196+203	ug/kg	16	0.10	18	6.11	6.13	5.67	93
Total PCBs	ug/kg	16	6.38	1,647	668	714	615	92	
PAHs	Acenaphthene	mg/kg	18	0.03	4.05	0.57	0.29	0.92	161
	Acenaphthylene	mg/kg	18	0.06	5.43	0.72	0.28	1.26	175
	Anthracene	mg/kg	18	0.09	12	2.28	0.80	3.29	144
	Fluorene	mg/kg	18	0.05	4.91	0.82	0.36	1.29	156
	Naphthalene	mg/kg	18	0.00	1.31	0.54	0.55	0.45	83
	Phenanthrene	mg/kg	18	0.95	22	8.69	7.35	6.13	71
	Benz[a]anthracene	mg/kg	18	0.41	22	6.41	4.72	5.44	85
	Benzo[a]pyrene	mg/kg	18	0.66	27	9.42	6.76	7.63	81
	Benzo[g,h,i]perylene	mg/kg	18	0.90	25	9.09	7.17	6.69	74
	Benzo[j,k]fluoranthene	mg/kg	18	0.96	32	11	8.11	8.69	79
	Benzo[j]fluoranthene	mg/kg	18	1.04	135	19	10	30	158
	Chrysene	mg/kg	18	1.32	189	24	12	43	179
	Dibenz[a,h]anthracene	mg/kg	18	0.17	5.10	1.61	1.39	1.19	74
	Fluoranthene	mg/kg	18	1.92	323	38	18	73	193
	Indeno[1,2,3-c,d]-pyrene	mg/kg	18	0.77	26	8.96	6.90	6.90	77
	Pyrene	mg/kg	18	1.60	252	31	15	57	184
	Low Molecular PAHs	mg/kg	18	1.87	44	14	9.59	11	83
	High Molecular PAHs	mg/kg	18	9.75	979	159	89	222	140
	Total PAHs	mg/kg	18	12	1,002	172	104	228	132
Pesticides	4,4'-DDD	ug/kg	16	6.93	502	53	19	121	227
	4,4'-DDE	ug/kg	16	19	242	58	47	53	91
	4,4'-DDT	ug/kg	15	41	388	125	105	86	69
	Aldrin	ug/kg	16	0.08	283	23	2.82	70	300
	Dieldrin	ug/kg	16	3.37	187	55	39	51	93
	Chlordane,gamma (trans)	ug/kg	16	8.79	273	114	82	69	60
Metals	Arsenic	mg/kg	17	5.19	28	14	13	5.55	40
	Cadmium	mg/kg	17	0.63	2.55	1.55	1.49	0.59	38
	Chromium	mg/kg	17	24	145	87	81	39	45
	Cobalt	mg/kg	17	2.26	35	14	14	7.52	54
	Copper	mg/kg	17	39	392	220	227	92	42
	Iron	mg/kg	17	8,872	66,734	34,965	34,365	13,726	39
	Lead	mg/kg	17	42	633	303	313	160	53
	Mercury	mg/kg	17	0.14	1.96	0.60	0.58	0.39	64
	Nickel	mg/kg	17	11	105	53	55	25	48
	Zinc	mg/kg	17	126	1,038	699	761	264	38

Note:

Data associated with a laboratory qualifier containing a 'U' were considered to be not detected and were set to be half of method detection limit.

Table 8-5: CARP CSO/SWO Sampling Locations and Dates

Selected Stations	Associated Sampling Dates			
CSO: Christie Street		October 16, 2002	April 11, 2003	
CSO: Court Street		October 16, 2002	April 11, 2003	
CSO: Elm Street			April 11, 2003	
CSO: Ivy Street		October 16, 2002	April 11, 2003	April 13, 2004
CSO: West Side Road		October 16, 2002		
SWO: Blanchard Street	September 25, 2001	October 16, 2002	April 11, 2003	
SWO: CCI		October 16, 2002	April 11, 2003	April 13, 2004
SWO: Smith Marina		October 16, 2002	April 11, 2003	April 13, 2004

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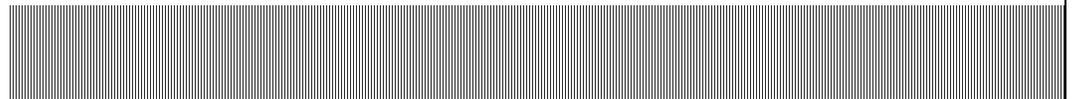


Table 9-1: Pore Water: Site Modeling Parameters

Parameter	Distribution Type		Value
Thickness Effectively Mixed by Bioturbation (cm)	Uniform	Minimum	0
		Average	5.5
		Maximum	30
Seepage Velocity in Sediment (cm/yr)	Uniform	Minimum	2
		Average	16
		Maximum	31
Area of Contaminated Sediment (m ²)	None (single value)		1.05E+06
Bulk Density of Sediment (g/cm ³)	Normal	Minimum	0.47
		Average	0.78
		Maximum	1.84
		Standard Deviation	0.358
Fraction Organic Carbon in Sediment	Uniform	Minimum	0.030
		Average	0.038
		Maximum	0.046
Dissolved Organic Carbon Concentration in Pore Water (mg/L)	Uniform	Minimum	0
		Average	5
		Maximum	10
Notes: Blue cells indicate assumptions; Green cells indicate literature values; Cells with no shading are site-specific values.			

Table 9-2. Pore Water: Contaminant Modeling Parameters

Parameter	Distribution		Contaminants			
			Mercury ^a	Lead ^a	Copper ^a	DDE
Organic Carbon Based Partition Coefficient (L/kg)	Normal	Min.				5151
		Ave.				802393
		Max.				4470000
		St. Dev.				1383381
Solubility of Contaminant in Water (mg/L)	Normal	Min.	0	0	0	0.001
		Ave.	3.85E-07	2.15E-03	0.0023	0.081
		Max.	7.69E-07	4.30E-03	0.0046	0.160
		St. Dev.	1.92E-07	1.08E-03	0.0012	0.040
Molecular Diffusion Coefficient in Water (cm ² /s)	Normal	Min.	5.04E-06	1.00E-07	1.00E-07	4.60E-06
		Ave.	6.30E-06	1.00E-06	1.00E-06	5.20E-06
		Max.	7.56E-06	1.00E-05	1.00E-05	5.87E-06
		St. Dev.	6.30E-07	1	1	3.18E-07
Sediment Contaminant Concentration (mg/kg)	Normal	Min.	5.009	360.407	245.09	0.155
		Ave.	5.869	425.677	289.34	0.195
		Max.	7.138	495.600	313.60	0.224
		St. Dev.	0.807	62.889	25.89	0.360
			2,3,7,8-TCDD	Total TCDD	BZ 52	BZ 180+193
Organic Carbon Based Partition Coefficient (L/kg)	Normal	Min.	19073917	14484848	1122100	37112299
		Ave.	21550251	32769933	1324245	37413293
		Max.	27315011	61315280	1519170	37714286
		St. Dev.	4719349	25044502	198634	425669
Solubility of Contaminant in Water (mg/L)	Normal	Min.	7.90E-06	7.90E-06	0.0003	0.0003
		Ave.	3.97E-05	3.97E-05	0.4500	0.4500
		Max.	2.00E-04	2.00E-04	0.9060	0.9060
		St. Dev.	4.80E-05	4.80E-05	0.2264	0.2264
Molecular Diffusion Coefficient in Water (cm ² /s)	Normal	Min.	4.90E-06	4.90E-06	6.40E-06	6.40E-06
		Ave.	5.40E-06	5.40E-06	8.00E-06	8.00E-06
		Max.	5.83E-06	5.83E-06	9.60E-06	9.60E-06
		St. Dev.	2.33E-07	2.33E-07	8.00E-07	8.00E-07
Sediment Contaminant Concentration (mg/kg)	Normal	Min.	2.67E-03	3.15E-03	0.211	0.066
		Ave.	3.59E-03	4.08E-03	0.268	0.080
		Max.	4.76E-03	5.08E-03	0.302	0.088
		St. Dev.	1.07E-03	9.70E-04	0.050	0.012
			Benzo(a) pyrene	Fluoranthene	Dieldrin	
Organic Carbon Based Partition Coefficient (L/kg)	Normal	Min.	930	19182	1072.4	
		Ave.	1310472	120953	164817.7	
		Max.	10200000	2400000	4677351.0	
		St. Dev.	2171584	430912	703338.7	
Solubility of Contaminant in Water (mg/L)	Normal	Min.	0.002	0.200	0.100	
		Ave.	0.008	0.230	0.177	
		Max.	0.047	0.260	0.224	
		St. Dev.	0.011	0.015	0.034	
Molecular Diffusion Coefficient in Water (cm ² /s)	Normal	Min.	5.00E-06	5.60E-06	4.40E-06	
		Ave.	7.00E-06	6.00E-06	4.57E-06	
		Max.	9.00E-06	6.35E-06	4.74E-06	
		St. Dev.	1.00E-06	1.88E-07	8.50E-08	
Sediment Contaminant Concentration (mg/kg)	Normal	Min.	3.214	6.181	0.0135	
		Ave.	3.710	8.222	0.0279	
		Max.	4.762	11.043	0.0557	
		St. Dev.	0.624	2.175	0.0240	

a. Metals do not have an organic carbon-based partitioning coefficient, which is used by the model to calculate a chemical's distribution coefficient (Kd) based on the organic content of the media. A metal's Kd is specified for the model based on experimental data (as found in the literature).

Table 9-3: River Data for Comparison

Contaminant	Dundee Dam Contaminant Flux (kg/yr)	Dundee Dam Sediments Percent Influent from EMBM	Calculated Whole River Contaminant Load (kg/yr)
Mercury	20	25%	83
Lead	3600	41%	9000
DDE	0.75	16%	3.4
2,3,7,8-TCDD	4.8E-05	.21%	0.0
Total TCDD	1.8E-03	4%	0.0
BZ 52	0.56	18%	3.3
BZ 180+193	0.56	33%	1.4
Benzo(a)pyrene	166	65%	230
Fluroanthene	260	71%	425.6

Table 9-4: Monte Carlo Results

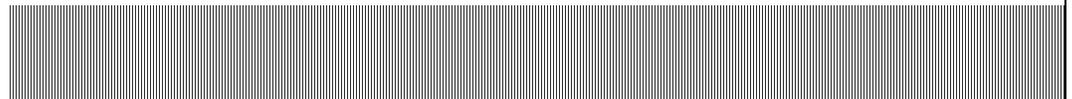
Contaminant	Probability that Pore Water Contributes 2% or More of River Contaminant Load	Probability that Pore Water Contributes 3% or More of River Contaminant Load	Probability that Pore Water Contributes 5% or More of River Contaminant Load	Probability that Pore Water Contributes 10% or More of River Contaminant Load
Mercury	0.00%	0.00%	0.00%	0.00%
Lead	0.00%	0.00%	0.00%	0.00%
DDE	0.07%	0.03%	0.00%	0.00%
2,3,7,8-TCDD	0.00%	0.00%	0.00%	0.00%
Total TCDD	0.00%	0.00%	0.00%	0.00%
BZ 52	0.00%	0.00%	0.00%	0.00%
BZ 180+193	0.00%	0.00%	0.00%	0.00%
Benzo(a)pyrene	0.00%	0.00%	0.00%	0.00%
Fluoranthene	0.00%	0.00%	0.00%	0.00%

Table 9-5: Comparison of Atmospheric Deposition at Dundee Dam

Compounds	Dundee Dam Concentration (ug/kg)	Dundee Dam Mass Flow Rate (g/d)	Literature Review Flux (ug/m ² -day)	Literature Review Mass Flow Rate (g/d)	Percentage of Atmospheric Flux to Dundee Dam
Arsenic	2,907	2,147	1	3.94	0.18%
Cadmium	1,503	1,110	0.50	1.97	0.18%
Chromium	30,874	22,795	15	59	0.26%
Copper	62,800	46,367	38	150	0.32%
Cobalt	8,775	6,479	1	3.94	0.06%
Lead	129,283	95,452	50	197	0.21%
Nickel	18,757	13,849	10	39	0.28%
Zinc	281,444	207,796	135	532	0.26%
Benz[a]anthracene	4,713	3,480	0.13	0.53	0.02%
Benzo[a]pyrene	5,640	4,164	0.11	0.43	0.01%
Fluoranthene	9,126	6,738	1.44	5.68	0.08%
Pyrene	9,069	6,696	0.96	3.78	0.06%
Total PCBs	563	415	2	8.28	1.99%
Chlordane,gamma (trans)	23	17	0.15	0.59	3.46%
Dieldrin	5	4	0.02	0.06	1.63%

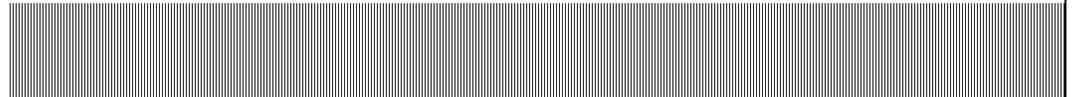
Agency Backcheck
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Section IV



Chapter 10 Tables

There are no tables associated with this chapter.



Agency Backcheck
Comprehensive Conceptual Site Model
Lower Passaic River Restoration Project

Chapter 11 Tables

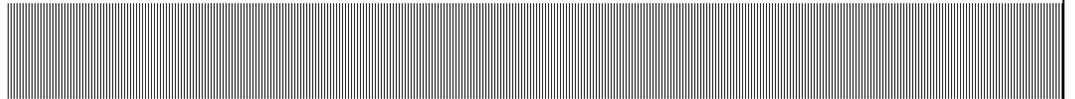


Table 11-1: Area of River Bottom by Side Scan Sonar Type

River Mile	Area (acres)				
	Silt	Silt and Sand	Sand	Gravel and Sand	Rock and Coarse Gravel
RM -0.9 to 2	128	8	0	0	0.4
RM 2 to 8	204	26	2.5	10	2.3
RM 8 to 12	23	4	36	45	4.3
RM 12 to 14.45	1.8	28	7	16	2.1
Total (RM 0.9 to 14.45)	357	66	46	71	9

Table 11-2a: Assignment of Fine-Grained Sediment Content by Sediment Type to Side Scan Sonar Sediment Class

Scenario 1			
ASI Texture Class (2005)	Side Scan Sonar Class by Flood (2008)	Fine-Grained Sediment Percentages from Flood (2008)	Final Values
Silt	Mud	90% Mud	90%
Silt and Sand	Sandy Mud	60% to 85% Mud	72.5%
Gravel and Sand	Gravel and Coarse Sand	2% Mud	2%
Rock and Coarse Gravel	Gravel and Coarse Sand	2% Mud	2%
Sand	Fine to Coarse Sand	10% Mud	10%

Scenario 2			
ASI Texture Class (2005)	Side Scan Sonar Class	Fine-Grained Sediment Percentages from Flood (2008)	Final Values
Silt	Mud	90% Mud	90%
Silt and Sand	Muddy Sand	9% to 50% Mud	29.5%
Gravel and Sand	Gravel and Coarse Sand	2% Mud	2%
Rock and Coarse Gravel	Gravel and Coarse Sand	2% Mud	2%
Sand	Fine to Coarse Sand	10% Mud	10%

Note:
Mud = Silt and Clay.

Table 11-2b: Percentages of Silt above and below RM8

River Mile	Percentage of Silt and Clay: Scenario 1	Percentage of Silt and Clay: Scenario 2
RM 0 to 8	85%	87%
RM 8 to 12	9%	9%
RM 8 to 14.5	6%	4%

Table 11-3: Hydrographic Datasets and Methodologies Compared in Measurement Uncertainty Study performed by OSI.

Method	1986	1989	GPS (2001)	Current (2001)
Positioning System	Hydro 1 Range Azimuth	Hydro 1 Range Azimuth	Trimble 7400 RTK GPS	Trimble 7400 RTK GPS
Depth Sounder	Raytheon DE719C (depths digitized manually after acquisition)	Raytheon DE719C with Odom Digitrace (depths digitized manually after acquisition)	Raytheon DE719C with Odom Digitrace (depths digitized manually after acquisition)	Odom Echotrac Model DF MKII 3200
Number of Surveys Considered in Comparison	3	3	3	1

Source Ocean Surveys, Inc., 2008

Table 11-4. Statistical Analysis of Measurement Uncertainty Performed by OSI

Method	Mean (bias) (feet)	Standard Deviation (feet)	Depth Accuracy at 95% Confidence (feet)
1986	0.02	± 0.33	± 0.65
GPS (2001)	0.03	± 0.12	± 0.25
Current (2001)	0.02	± 0.11	± 0.22

Source: OSI, 2008

Table 11-5. Interpolation Uncertainty due to Method of Representation estimated by TIN to 2007 comparison

Year	Mean (ft)	Max (ft)	Min (ft)	Standard Deviation (ft)
1995-2007	0.28	18.61	0.00	0.65
1996-2007	0.29	17.66	0.00	0.61
1997-2007	0.29	20.71	0.00	0.65
1999-2007	0.30	20.98	0.00	0.70
2001-2007	0.30	16.77	0.00	0.67
2004-2007	0.27	18.30	0.00	0.59

Table 11-6: Interpolation Uncertainty due to Variation in the Transects Alignment estimated by TIN to TIN comparison

Year	Mean (ft)	Max (ft)	Min (ft)	Standard Deviation (ft)
1995-1996	0.15	8.76	0.00	0.29
1996-1997	0.21	8.40	0.00	0.33
1997-1999	0.21	8.80	0.00	0.35
1999-2001	0.16	8.30	0.00	0.34
2001-2004	0.30	10.38	0.00	0.57

Table 11-7: Interpolation Uncertainty due to Variation in Transects Alignment Estimated by Cross Section to Cross Section comparison

Year	Mean (ft)	Median (ft)	95 th Quantiles (ft)	5 th Quantiles (ft)
1995	0.14	0.08	0.43	0.00
1996	0.10	0.07	0.32	0.01
1997	0.15	0.07	0.61	0.01
1999	0.10	0.08	0.24	0.00
2001	0.10	0.07	0.33	0.01
2004	0.20	0.14	0.73	0.01

Table 11-8: Estimate of Net Sediment Deposition by Survey Pair - Point Estimate vs. Conditional Simulation

Point Estimates

RM 0-7

Survey Pair	Average No. of Locations per Survey	Change in Average Elevation (in.)	Std Error (in.)	5th Percentile (in)	95th Percentile (in)	Area (RM 0-7) (acres)	Net Depositional Volume (cy)	5th Percentile (cy)	95th Percentile (cy)	Months Between Surveys	Net Deposition Rate (cy/yr)	5th Percentile (cy/yr)	95th Percentile (cy/yr)	Net Deposition Rate (in/yr)	5th Percentile (in/yr)	95th Percentile (in/yr)
1995 - 1996	14,772	3.7	0.9	2.0	5.4	334	165,000	88,000	242,000	20	99,000	53,000	145,000	2.2	1.2	3.2
1996 - 1997	14,804	-2.3	0.9	-4.0	-0.6	334	-104,000	-180,000	-28,000	6	-208,000	-360,000	-56,000	-4.6	-8.0	-1.3
1997 - 1999	14,637	3.3	0.9	1.6	5.0	334	147,000	71,000	223,000	25	71,000	34,000	107,000	1.6	0.8	2.4
1999 - 2001	14,701	4.0	0.9	2.3	5.7	334	180,000	104,000	257,000	26	83,000	48,000	119,000	1.9	1.1	2.6
2001 - 2004	15,317	1.2	0.8	-0.5	2.8	334	53,000	-22,000	127,000	39	16,000	-7,000	39,000	0.4	-0.2	0.9
1995 - 2004		9.8				334	441,000			116	46,000			1.0		

Conditional Simulation Results

RM 0-7

Survey Pair	Change in Average Elevation (in.)	Std Error (in.)	5th Percentile (in)	95th Percentile (in)	Area (RM 0-7) (acres)	Net Depositional Volume (cy)	5th Percentile (cy)	95th Percentile (cy)	Months Between Surveys	Net Deposition Rate (cy/yr)	5th Percentile (cy/yr)	95th Percentile (cy/yr)	Net Deposition Rate (in/yr)	5th Percentile (in/yr)	95th Percentile (in/yr)
1995 - 1996	4.1	NA	3.4	4.8	343	187,000	156,000	220,000	20	112,000	94,000	132,000	2.4	2.0	2.9
1996 - 1997	-0.4	NA	-1.1	0.3	343	-20,000	-50,000	16,000	6	-40,000	-101,000	31,000	-0.9	-2.2	0.7
1997 - 1999	1.7	NA	0.6	2.8	319	72,000	24,000	118,000	25	35,000	11,000	57,000	0.8	0.3	1.3
1999 - 2001	3.5	NA	2.7	4.3	320	152,000	114,000	186,000	26	70,000	53,000	86,000	1.6	1.2	2.0
2001 - 2004	1.7	NA	0.7	2.9	320	75,000	29,000	126,000	39	23,000	9,000	39,000	0.5	0.2	0.9
1995 - 2004	10.6				329	466,000			116	48,000			1.1		

Table 11-9: Annual Sedimentation Cutoff Rates for Bathymetrically Neutral Areas

Survey Range	Annual Sedimentation Rate (in/year)
1995 - 1996	-2.25 to 2.25
1996 - 1997	-7.5 to 7.5
1997 - 1999	-1.8 to 1.8
1999 - 2001	-1.73 to 1.73
2001 - 2004	-1.15 to 1.15

Table 11-10. Sedimentation cut off rates and color scheme of erosional and depositional areas

Accumulation Class	Cutoff (in/month)	Annual Cutoff (in/yr)	Color
Erosional	<-1	<-12	Red
	-0.75 to -1	-9 to -12	Orange
	LN to -0.75	LN to -9	Yellow
Depositional	UN to 0.75	UN to 9	Green
	0.75 to 1	9 to 12	Light Blue
	>1	>12	Dark Blue

LN: Indicates the lower cutoff value of the neutral area

UN: Indicates the upper cutoff value of the neutral area

Table 11-11a. Deposition and Erosion by Year (1995-2004) - TIN Analysis

Year	River Mile	River Bottom Area (acres)				Volume (cy/year)				Sedimentation rate (in./yr)				Percent of Resuspended Solids in Gross Deposition
		Depositional	Erosional	Neutral	Total	Depositional	Erosional	Neutral	Net	Depositional	Erosional	Neutral	Net	
1995 - 1996	RM 0.9 - 1	6	0.1	2	9	10,487	-79	211	10,619	12.67	-4.77	0.64	12.8	1%
	RM 1 - 2	38	6	26	70	40,815	-7,007	163	33,971	8	-8.44	0.05	6.7	17%
	RM 2 - 3	37	7	27	70	26,295	-5,552	1,888	22,631	5.29	-6.22	0.52	4.6	21%
	RM 3 - 4	22	5	31	58	14,679	-2,637	1,250	13,293	4.96	-4.26	0.3	4.5	18%
	RM 4 - 5	15	11	24	50	14,752	-8,260	34	6,526	7.12	-5.8	0.01	3.2	56%
	RM 5 - 6	14	8	18	39	11,062	-5,958	283	5,388	5.84	-5.87	0.12	2.8	54%
	RM 6 - 7	14	8	16	39	12,291	-6,757	-54	5,481	6.37	-6.21	-0.02	2.8	55%
1996 - 1997	RM 0.9 - 1	3	1	4	9	9,375	-5,600	12	3,787	21.22	-35.7	0.02	8.6	60%
	RM 1 - 2	20	10	39	70	49,152	-20,125	2,076	31,103	18.17	-14.3	0.39	11.5	41%
	RM 2 - 3	11	19	41	70	23,173	-36,513	-3,324	-16,664	16.36	-14.24	-0.61	-11.8	158%
	RM 3 - 4	4	19	34	58	7,261	-35,790	-8,420	-36,948	15.03	-13.67	-1.82	-76.5	493%
	RM 4 - 5	9	18	23	50	30,152	-42,440	-3,584	-15,871	23.67	-17.61	-1.18	-12.5	141%
	RM 5 - 6	5	21	14	39	13,414	-53,212	-3,002	-42,800	21.15	-19.22	-1.58	-67.5	397%
	RM 6 - 7	6	12	21	39	15,271	-25,327	-2,593	-12,649	20.26	-15.71	-0.91	-16.8	166%
1997 - 1999	RM 0.9 - 1	3	1	5	9	2,265	-687	141	1,719	6.25	-3.69	0.22	4.7	30%
	RM 1 - 2	19	15	36	70	9,415	-9,699	954	670	3.76	-4.77	0.2	0.3	103%
	RM 2 - 3	33	10	27	70	18,842	-5,760	816	13,898	4.19	-4.23	0.23	3.1	31%
	RM 3 - 4	27	5	25	58	15,872	-2,494	1,104	14,481	4.33	-3.56	0.33	3.9	16%
	RM 4 - 5	19	11	20	50	12,135	-7,790	641	4,986	4.78	-5.42	0.23	2	64%
	RM 5 - 6	24	5	11	39	20,373	-3,310	539	17,602	6.4	-5.43	0.36	5.5	16%
	RM 6 - 7	19	5	14	39	12,228	-3,839	859	9,248	4.72	-5.68	0.44	3.6	31%

Table 11-11a. Deposition and Erosion by Year (1995-2004) - TIN Analysis

Year	River Mile	River Bottom Area (acres)				Volume (cy/year)				Sedimentation rate (in./yr)				Percent of Resuspended Solids in Gross Deposition
		Depositional	Erosional	Neutral	Total	Depositional	Erosional	Neutral	Net	Depositional	Erosional	Neutral	Net	
1999 - 2001	RM 0.9 - 1	6	0.1	2	9	4,804	-31	231	5,003	5.65	-3.05	0.73	5.9	1%
	RM 1 - 2	28	7	35	70	14,575	-3,933	1,696	12,339	3.87	-4.3	0.36	3.3	27%
	RM 2 - 3	31	6	33	70	18,185	-2,875	1,072	16,382	4.34	-3.3	0.24	3.9	16%
	RM 3 - 4	24	14	20	58	18,593	-7,067	108	11,633	5.78	-3.78	0.04	3.6	38%
	RM 4 - 5	20	11	19	50	18,492	-6,733	88	11,847	6.87	-4.49	0.03	4.4	36%
	RM 5 - 6	15	11	13	39	10,751	-8,319	216	2,648	5.4	-5.4	0.12	1.3	2%
	RM 6 - 7	16	13	10	39	12,408	-8,570	57	3,895	5.88	-4.75	0.04	1.8	69%
2001 - 2004	RM 0.9 - 1	5	1	3	9	2,875	-1,166	26	1,735	4.75	-6.81	0.06	2.9	41%
	RM 1 - 2	37	8	25	70	23,021	-2,317	-60	20,644	4.61	-2.27	-0.02	4.1	10%
	RM 2 - 3	16	26	29	70	6,684	-9,814	-493	-3,623	3.17	-2.79	-0.13	-1.7	147%
	RM 3 - 4	15	16	26	58	4,489	-5,758	-133	-1,402	2.22	-2.62	-0.04	-0.7	128%
	RM 4 - 5	11	20	19	50	5,859	-10,891	-127	-5,160	4.03	-4	-0.05	-3.6	186%
	RM 5 - 6	8	19	13	39	3,371	-10,889	-167	-7,686	3.16	-4.29	-0.1	-7.2	323%
	RM 6 - 7	12	12	15	39	4,870	-5,619	17	-733	3.06	-3.55	0.01	-0.5	115%

Data Sources:

1995 Single Beam Survey, Ocean Surveys, Inc. for TSI

1996 Single Beam Survey, Ocean Surveys, Inc. for TSI

1997 Single Beam Survey, Ocean Surveys, Inc. for TSI

1999 Single Beam Survey, Ocean Surveys, Inc. for TSI

2001 Single Beam Survey, Ocean Surveys, Inc. for TSI

2004 Single Beam Survey, Rogers Surveying, Inc. for USACE

Table 11-11b. Deposition and Erosion by Year 1989-2007 from Conditional Simulation

Year 1	Year 2	River Mile	Depositional Area (acres)			Erosional Area (acres)			Depositional Volume (cy)			Erosional Volume (cy)			Net Volume (cy)		
			Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile
1989	1995	RM 0 to 1	23	17	30	16	10	23	130,378	86,856	189,913	-55,190	-93,096	-28,195	74,992	-3,081	158,298
1989	1995	RM 1 to 2	39	34	43	25	21	30	161,671	129,296	193,008	-78,699	-109,356	-54,925	84,093	28,446	128,033
1989	1995	RM 2 to 3	32	26	38	32	25	38	85,659	60,725	112,734	-77,947	-107,283	-52,837	8,981	-42,028	57,354
1989	1995	RM 3 to 4	24	19	29	26	21	30	80,355	59,712	103,555	-75,635	-101,491	-50,435	4,163	-36,025	47,630
1989	1995	RM 4 to 5	24	20	29	21	17	25	70,714	51,282	91,686	-62,293	-86,063	-42,668	8,758	-33,020	47,939
1989	1995	RM 5 to 6	21	18	25	17	14	20	63,035	48,676	82,812	-51,451	-68,528	-35,173	11,588	-16,469	43,946
1989	1995	RM 6 to 7	21	17	24	19	16	22	63,875	49,017	81,191	-55,029	-74,326	-39,284	9,638	-22,486	39,740
1989	1995	RM 7 to 8	13	10	17	10	6	13	41,681	27,230	59,224	-28,279	-44,767	-16,098	13,325	-15,227	41,917
1989	1995	RM 0 to 7	184	178	190	156	150	162	660,323	616,117	705,286	-460,920	-501,796	-427,514	199,150	138,411	258,092
1995	1996	RM 0 to 1	29	20	37	12	4	21	69,141	35,008	115,575	-15,997	-40,807	-3,091	53,979	-110	111,525
1995	1996	RM 1 to 2	44	35	52	23	15	31	91,998	61,434	125,870	-34,771	-55,442	-20,084	58,029	8,439	100,917
1995	1996	RM 2 to 3	40	30	49	24	15	33	67,934	39,615	100,019	-33,918	-60,270	-16,244	33,631	-15,095	81,368
1995	1996	RM 3 to 4	29	21	36	21	14	29	53,953	30,681	80,257	-34,301	-59,474	-17,686	19,035	-24,958	59,119
1995	1996	RM 4 to 5	24	17	31	22	16	29	47,563	27,814	70,348	-40,507	-65,611	-23,014	5,824	-34,488	44,597
1995	1996	RM 5 to 6	21	15	26	18	13	24	40,210	23,815	59,257	-32,548	-50,674	-18,195	7,437	-24,453	39,298
1995	1996	RM 6 to 7	20	15	25	17	12	22	41,774	24,418	60,216	-30,679	-47,468	-16,955	10,550	-20,471	38,907
1995	1996	RM 7 to 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1995	1996	RM 0 to 7	206	198	214	137	129	145	419,807	391,393	446,389	-231,955	-260,233	-206,870	187,478	156,365	220,236
1996	1997	RM 0 to 1	24	12	35	16	5	28	35,644	11,302	77,745	-20,569	-54,134	-4,226	15,898	-37,152	72,366
1996	1997	RM 1 to 2	36	26	47	31	20	41	58,247	33,194	89,614	-42,422	-70,334	-21,883	15,679	-33,949	65,997
1996	1997	RM 2 to 3	31	21	41	33	23	43	42,849	21,700	72,430	-47,735	-76,025	-26,564	-5,367	-50,755	41,072
1996	1997	RM 3 to 4	23	14	31	28	20	36	35,324	16,683	60,137	-46,859	-76,355	-26,245	-11,181	-55,058	32,491
1996	1997	RM 4 to 5	21	14	29	25	17	33	37,813	19,908	63,095	-45,648	-69,116	-24,871	-6,756	-46,370	37,816
1996	1997	RM 5 to 6	16	11	21	23	17	28	27,010	14,658	42,630	-43,948	-65,660	-28,265	-16,762	-47,742	12,778
1996	1997	RM 6 to 7	17	11	23	20	14	26	28,932	15,023	46,300	-36,719	-56,826	-20,997	-7,469	-38,757	24,658
1996	1997	RM 7 to 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	1997	RM 0 to 7	168	159	175	176	168	185	274,182	249,193	301,269	-293,587	-318,685	-265,261	-19,912	-50,482	15,659
1997	1999	RM 0 to 1	7	3	11	10	5	13	14,552	5,816	31,931	-44,590	-72,354	-21,929	-29,965	-65,528	9,368
1997	1999	RM 1 to 2	34	23	44	32	22	44	44,708	23,209	70,759	-45,006	-68,959	-25,247	531	-43,701	41,911
1997	1999	RM 2 to 3	38	27	48	25	16	37	54,903	31,204	84,505	-31,529	-57,073	-14,452	22,864	-22,994	65,904
1997	1999	RM 3 to 4	30	22	38	20	12	28	50,702	29,598	78,818	-29,211	-52,756	-11,778	20,798	-18,536	64,286
1997	1999	RM 4 to 5	25	17	32	21	14	29	42,107	24,341	67,207	-34,438	-57,186	-18,431	8,203	-29,677	46,834
1997	1999	RM 5 to 6	25	20	30	14	9	19	49,451	32,486	72,699	-21,349	-33,434	-10,232	28,191	1,034	60,703
1997	1999	RM 6 to 7	23	17	28	14	9	20	41,006	25,421	58,522	-21,744	-37,293	-11,211	18,978	-7,636	45,638
1997	1999	RM 7 to 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	1999	RM 0 to 7	182	170	193	138	126	150	304,922	273,415	338,761	-234,870	-263,914	-205,877	72,081	23,921	118,407
1999	2001	RM 0 to 1	12	6	15	4	1	10	30,473	7,590	64,042	-6,332	-25,263	-418	24,365	-16,548	62,495
1999	2001	RM 1 to 2	42	30	52	25	15	37	53,579	31,277	78,407	-24,618	-44,373	-11,272	28,373	-12,326	63,620
1999	2001	RM 2 to 3	39	29	50	24	14	35	53,570	31,673	81,873	-23,761	-43,762	-9,939	30,336	-9,964	68,547
1999	2001	RM 3 to 4	29	22	35	21	15	28	53,678	33,726	79,746	-29,271	-49,343	-16,705	24,414	-10,623	60,895
1999	2001	RM 4 to 5	27	21	34	19	13	26	55,464	36,581	77,030	-26,546	-45,282	-13,917	27,802	-5,463	60,483
1999	2001	RM 5 to 6	21	16	27	17	12	23	34,807	22,842	52,363	-23,839	-39,317	-12,815	10,798	-14,856	38,293
1999	2001	RM 6 to 7	20	16	25	18	13	22	35,163	23,305	51,787	-28,050	-42,780	-15,917	7,257	-14,802	34,185
1999	2001	RM 7 to 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	2001	RM 0 to 7	190	179	199	130	120	141	323,375	295,818	350,649	-172,457	-194,880	-147,860	151,960	113,983	185,812
2001	2002	RM 0 to 1	8	5	11	7	4	11	30,758	13,547	53,730	-20,742	-38,506	-10,463	10,850	-22,896	41,342
2001	2002	RM 1 to 2	28	21	35	37	30	44	48,683	33,244	66,893	-68,474	-89,577	-49,156	-20,623	-54,660	15,508
2001	2002	RM 2 to 3	23	16	29	41	34	47	42,368	27,891	62,277	-93,432	-120,527	-68,428	-50,134	-89,508	-9,450
2001	2002	RM 3 to 4	22	17	28	28	22	33	44,421	29,269	63,457	-56,561	-75,797	-38,974	-44,319	-22,836	22,836
2001	2002	RM 4 to 5	19	15	24	27	22	32	35,671	23,764	53,078	-63,627	-81,144	-46,251	-27,364	-53,792	3,432
2001	2002	RM 5 to 6	15	12	19	24	20	27	31,412	21,263	44,899	-60,755	-76,524	-46,831	-29,178	-54,831	-3,009
2001	2002	RM 6 to 7	15	11	18	23	20	27	28,594	19,090	40,316	-53,913	-69,319	-41,842	-25,473	-47,262	-3,107
2001	2002	RM 7 to 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	2002	RM 0 to 7	130	122	137	187	180	195	267,758	244,233	291,605	-420,121	-448,656	-392,647	-153,683	-194,984	-109,589
2002	2004	RM 0 to 1	26	18	33	14	8	22	70,453	37,730	135,505	-49,442	-100,333	-17,181	18,866	-53,131	114,856
2002	2004	RM 1 to 2	46	39	51	20	14	26	126,415	98,924	160,690	-34,990	-53,919	-21,576	90,776	48,181	136,301
2002	2004	RM 2 to 3	39	32	46	25	18	31	99,195	71,280	130,974	-52,951	-77,955	-32,275	45,538	-239	96,674
2002	2004	RM 3 to 4	27	21	32	23	18	29	60,473	40,123	80,484	-52,894	-73,040	-36,229	7,489	-32,250	41,531
2002	2004	RM 4 to 5	25	20	30	21	16	26	74,463	56,297	95,456	-47,593	-67,192	-31,098	27,199	-6,105	62,269
2002	2004	RM 5 to 6	21	17	25	18	14	22	53,919	39,090	71,787	-42,667	-60,198	-29,964	10,551	-19,959	40,916
2002	2004	RM 6 to 7	23	20	27	16	12	20	58,662	42,965	77,889	-36,100	-50,079	-22,519	22,522	-3,133	51,917
2002	2004	RM 7 to 8	11	8	15	12	8	16	25,986	13,816	42,692	-28,752	-45,457	-16,652	-2,501	-27,231	23,244
2002	2004	RM 0 to 7	206	201	212	137	131	143	551,771	524,700	590,760						

Table 11-11c. Deposition and Erosion by River Mile (1994-2004) - TIN Analysis

River Mile	Year	River Bottom Area (acres)				Volume (cy/year)				Sedimentation rate (in./yr)				Percent of Resuspended Solids in Gross Deposition
		Depositional	Erosional	Neutral	Total	Depositional	Erosional	Neutral	Net	Depositional	Erosional	Neutral	Net	
RM 0.9 - 1	1995 - 1996	6	0.1	2	9	10,487	-79	211	10,619	12.67	-4.77	0.64	12.8	1%
	1996 - 1997	3	1	4	9	9,375	-5,600	12	3,787	21.22	-35.7	0.02	8.6	60%
	1997 - 1999	3	1	5	9	2,265	-687	141	1,719	6.25	-3.69	0.22	4.7	30%
	1999 - 2001	6	0.1	2	9	4,804	-31	231	5,003	5.65	-3.05	0.73	5.9	1%
	2001 - 2004	5	1	3	9	2,875	-1,166	26	1,735	4.75	-6.81	0.06	2.9	41%
RM 1 - 2	1995 - 1996	38	6	26	70	40,815	-7,007	163	33,971	8	-8.44	0.05	6.7	17%
	1996 - 1997	20	10	39	70	49,152	-20,125	2,076	31,103	18.17	-14.3	0.39	11.5	41%
	1997 - 1999	19	15	36	70	9,415	-9,699	954	670	3.76	-4.77	0.2	0.3	103%
	1999 - 2001	28	7	35	70	14,575	-3,933	1,696	12,339	3.87	-4.3	0.36	3.3	27%
	2001 - 2004	37	8	25	70	23,021	-2,317	-60	20,644	4.61	-2.27	-0.02	4.1	10%
RM 2 - 3	1995 - 1996	37	7	27	70	26,295	-5,552	1,888	22,631	5.29	-6.22	0.52	4.6	21%
	1996 - 1997	11	19	41	70	23,173	-36,513	-3,324	-16,664	16.36	-14.24	-0.61	-11.8	158%
	1997 - 1999	33	10	27	70	18,842	-5,760	816	13,898	4.19	-4.23	0.23	3.1	31%
	1999 - 2001	31	6	33	70	18,185	-2,875	1,072	16,382	4.34	-3.3	0.24	3.9	16%
	2001 - 2004	16	26	29	70	6,684	-9,814	-493	-3,623	3.17	-2.79	-0.13	-1.7	147%
RM 3 - 4	1995 - 1996	22	5	31	58	14,679	-2,637	1,250	13,293	4.96	-4.26	0.3	4.5	18%
	1996 - 1997	4	19	34	58	7,261	-35,790	-8,420	-36,948	15.03	-13.67	-1.82	-76.5	493%
	1997 - 1999	27	5	25	58	15,872	-2,494	1,104	14,481	4.33	-3.56	0.33	3.9	16%
	1999 - 2001	24	14	20	58	18,593	-7,067	108	11,633	5.78	-3.78	0.04	3.6	38%
	2001 - 2004	15	16	26	58	4,489	-5,758	-133	-1,402	2.22	-2.62	-0.04	-0.7	128%
RM 4 - 5	1995 - 1996	15	11	24	50	14,752	-8,260	34	6,526	7.12	-5.8	0.01	3.2	56%
	1996 - 1997	9	18	23	50	30,152	-42,440	-3,584	-15,871	23.67	-17.61	-1.18	-12.5	141%
	1997 - 1999	19	11	20	50	12,135	-7,790	641	4,986	4.78	-5.42	0.23	2	64%
	1999 - 2001	20	11	19	50	18,492	-6,733	88	11,847	6.87	-4.49	0.03	4.4	36%
	2001 - 2004	11	20	19	50	5,859	-10,891	-127	-5,160	4.03	-4	-0.05	-3.6	186%

Table 11-11c. Deposition and Erosion by River Mile (1995-2004) - TIN Analysis

River Mile	Year	River Bottom Area (acres)				Volume (cy/year)				Sedimentation rate (in./yr)				Percent of Resuspended Solids in Gross Deposition
		Depositional	Erosional	Neutral	Total	Depositional	Erosional	Neutral	Net	Depositional	Erosional	Neutral	Net	
RM 5 - 6	1995 - 1996	14	8	18	39	11,062	-5,958	283	5,388	5.84	-5.87	0.12	2.8	54%
	1996 - 1997	5	21	14	39	13,414	-53,212	-3,002	-42,800	21.15	-19.22	-1.58	-67.5	397%
	1997 - 1999	24	5	11	39	20,373	-3,310	539	17,602	6.4	-5.43	0.36	5.5	16%
	1999 - 2001	15	11	13	39	10,751	-8,319	216	2,648	5.4	-5.4	0.12	1.3	77%
	2001 - 2004	8	19	13	39	3,371	-10,889	-167	-7,686	3.16	-4.29	-0.1	-7.2	323%
RM 6 - 7	1995 - 1996	14	8	16	39	12,291	-6,757	-54	5,481	6.37	-6.21	-0.02	2.8	55%
	1996 - 1997	6	12	21	39	15,271	-25,327	-2,593	-12,649	20.26	-15.71	-0.91	-16.8	166%
	1997 - 1999	19	5	14	39	12,228	-3,839	859	9,248	4.72	-5.68	0.44	3.6	31%
	1999 - 2001	16	13	10	39	12,408	-8,570	57	3,895	5.88	-4.75	0.04	1.8	69%
	2001 - 2004	12	12	15	39	4,870	-5,619	17	-733	3.06	-3.55	0.01	-0.5	115%

Data Sources:

1995 Single Beam Survey, Ocean Surveys, Inc. for TSI

1996 Single Beam Survey, Ocean Surveys, Inc. for TSI

1997 Single Beam Survey, Ocean Surveys, Inc. for TSI

1999 Single Beam Survey, Ocean Surveys, Inc. for TSI

2001 Single Beam Survey, Ocean Surveys, Inc. for TSI

2004 Single Beam Survey, Rogers Surveying, Inc. for USACE

Table 11-12a. Summary of Deposition and Erosion River Section Subtotals 1995-2004 - TIN Analysis

River Mile	Year	Volume (cy/yr)				River Bottom Area (acres)	Net Sedimentation Rate (in/yr)	Percent of Resuspended Solids in Gross Deposition
		Depositional	Erosional	Neutral	Net			
RM 0.9 - 1	1995 - 2004	4,800	-900	100	4,100	0	0.00	18%
RM 1 - 2	1995 - 2004	22,600	-6,000	700	17,300	100	0	27%
RM 2 - 3	1995 - 2004	16,100	-8,000	400	8,500	100	0	50%
RM 3 - 4	1995 - 2004	12,000	-6,400	0	5,600	100	0	53%
RM 4 - 5	1995 - 2004	12,800	-10,500	-100	2,300	100	0	82%
RM 5 - 6	1995 - 2004	10,500	-10,000	0	500	0	0	95%
RM 6 - 7	1995 - 2004	10,000	-7,100	100	2,900	0	0	71%

Data Sources:

- 1995 Single Beam Survey, Ocean Surveys, Inc. for TSI
- 1996 Single Beam Survey, Ocean Surveys, Inc. for TSI
- 1997 Single Beam Survey, Ocean Surveys, Inc. for TSI
- 1999 Single Beam Survey, Ocean Surveys, Inc. for TSI
- 2001 Single Beam Survey, Ocean Surveys, Inc. for TSI
- 2004 Single Beam Survey, Rogers Surveying, Inc. for USACE

Table 11 - 12 b. Summary of Deposition and Erosion River Section Subtotals 1995-2004 - Conditional Simulation

RM Range	Year 1	Year 2	Depositional Area (acres)			Erosional Area (acres)			Total Area (acres)	Depositional Volume (cy/yr)			Erosional Volume (cy/yr)			Net Volume (cy/yr) ^a			Net Sedimentation Rate (inch/yr)		
			Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile		Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile
RM 0 to 1	1995	2004	31	26	36	10	5	15	40	28,000	12,000	53,000	-17,500	-36,800	-6,400	13,000	3,900	23,000	2.40	0.72	4.24
RM 1 to 2	1995	2004	54	48	60	13	7	19	67	47,000	31,000	66,000	-27,800	-42,500	-16,600	19,000	14,000	25,000	2.12	1.56	2.78
RM 2 to 3	1995	2004	45	38	51	19	13	26	64	40,000	25,000	59,000	-31,500	-48,400	-18,700	8,600	3,200	14,000	1.01	0.37	1.64
RM 3 to 4	1995	2004	32	27	38	18	12	23	50	33,000	20,000	49,000	-27,700	-43,000	-16,400	5,200	700	10,000	0.77	0.10	1.48
RM 4 to 5	1995	2004	26	21	32	20	15	25	46	33,000	21,000	47,000	-28,700	-42,800	-17,500	3,800	-600	8,600	0.61	-0.10	1.38
RM 5 to 6	1995	2004	21	16	26	18	13	23	39	26,000	17,000	38,000	-25,000	-36,200	-16,300	1,200	-2,500	5,100	0.23	-0.48	0.98
RM 6 to 7	1995	2004	23	18	27	16	12	21	39	26,000	17,000	37,000	-23,000	-33,800	-14,400	2,900	-600	6,700	0.55	-0.11	1.27
RM 7 to 8	1995	2004	10	5	15	14	9	19	23	2,900	1,500	4,700	-3,200	-5,100	-1,900	-1,300	-4,800	2,100	-0.41	-1.52	0.67
RM 0 to 7	1995	2004	231	222	240	115	106	123	345	238,000	220,000	258,000	-186,400	-205,600	-167,400	53,000	48,000	61,000	1.14	1.03	1.31

Table 11 - 12 c. Summary of Deposition and Erosion River Section Subtotals 1995-2004 - Comparison

RM Range	Year Range	Total Area (acres)	Point Based Estimate ¹	Net Volume (cy/yr)			Within Uncertainty Bound	Point Based Estimate	Net Sedimentation Rate (in/yr)			Within Uncertainty Bound
				Conditional Simulation					Conditional Simulation			
				Median	5th Percentile	95th Percentile			Median	5th Percentile	95th Percentile	
RM 0 to 1	1995-2004	40.31	18,000	13,000	3,900	23,000	Yes	3.39	2.32	0.72	4.28	Yes
RM 1 to 2	1995-2004	66.82	17,000	19,000	14,000	25,000	Yes	1.84	2.14	1.55	2.81	Yes
RM 2 to 3	1995-2004	63.61	7,700	8,600	3,200	14,000	Yes	0.90	1.00	0.38	1.60	Yes
RM 3 to 4	1995-2004	50.28	4,900	5,200	700	10,000	Yes	0.72	0.77	0.11	1.51	Yes
RM 4 to 5	1995-2004	46.38	2,100	3,800	-600	8,600	Yes	0.34	0.61	-0.09	1.37	Yes
RM 5 to 6	1995-2004	38.80	500	1,200	-2,500	5,100	Yes	0.10	0.24	-0.49	0.97	Yes
RM 6 to 7	1995-2004	39.23	2,900	2,900	-600	6,700	Yes	0.56	0.56	-0.11	1.26	Yes
RM 0 to 7	1995-2004	345	53,100	53,400	48,000	61,000	Yes	1.14	1.15	1.04	1.31	Yes

Note:

¹Volume is adjusted based on the conditional simulation analysis total area.

Table 11-13. Annual Sedimentation Cutoff Rates for Bathymetry Neutral Areas 1989 to 2007 and 2004 to 2007 comparisons

Survey	Annual Sedimentation Rate For Neutral Areas (in/year)
1989 - 2007	-0.21 to 0.21
2004 - 2007	-1.32 to 1.32

Table 11-14a. Deposition and Erosion by River Mile 1989-2007 - Point Based Estimate

River Mile	River Bottom Area (acres)				Volume (cy/yr)				Sedimentation Rate (in./yr)				Percent of Resuspended Solids in Gross Deposition
	Depositional	Erosional	Neutral	Total	Depositional	Erosional	Neutral	Net	Depositional	Erosional	Neutral	Net	
RM -0.9 to 1	71	13	8	92	38,000	-1,470	-60	36,000	3.97	-0.85	-0.05	2.94	4%
RM 1 to 2	38	9	7	54	15,000	-870	-10	14,000	2.92	-0.75	-0.01	1.95	6%
RM 2 to 3	33	12	12	56	5,100	-920	20	4,200	1.16	-0.58	0.01	0.55	18%
RM 3 to 4	21	13	8	42	3,000	-1,760	20	1,300	1.06	-1.03	0.02	0.23	58%
RM 4 to 5	21	15	5	41	3,600	-2,250	1	1,400	1.3	-1.13	0	0.25	62%
RM 5 to 6	18	11	8	37	2,300	-1,270	-10	1,100	0.95	-0.88	-0.01	0.22	54%
RM 6 to 7	17	12	8	37	2,000	-1,530	10	510	0.87	-0.99	0.01	0.1	75%
RM 7 to 8	15	10	7	33	1,700	-1,360	8	340	0.81	-1	0.01	0.08	80%
RM 8 to 9	9	11	7	27	1,300	-1,350	3	-20	1.04	-0.95	0	-0.01	102%
RM 9 to 10	18	5	4	28	3,000	-880	20	2,100	1.22	-1.2	0.03	0.58	29%
RM 10 to 11	20	6	4	30	2,800	-970	10	1,800	1.01	-1.27	0.02	0.45	35%
RM 11 to 12	14	9	4	27	2,400	-1,170	-10	1,300	1.28	-0.95	-0.01	0.35	48%
RM 12 to 13	15	6	3	24	2,400	-940	4	1,500	1.2	-1.21	0.01	0.47	39%
RM 13 to 14	7	14	1	22	880	-3,500	10	-2,620	0.94	-1.86	0.03	-0.87	399%
RM 14 to 14.45	6	3	1	10	1,400	-690	2	740	1.64	-1.97	0.02	0.56	48%

Data Sources:
 1989 Single Beam Survey , Topometric Inc. for USACE.
 2007 Multi-Beam Survey, Gahagan & Bryant Associates, Inc. for CPG

Table 11-14b. Deposition and Erosion by River Mile 1989-2007 - Conditional Simulation Simple Comparison

River Mile	Year 1	Year 2	Depositional Area (acres)			Erosional Area (acres)			Total Area (acres)	Depositional Volume (cy/yr)			Erosional Volume (cy/yr)			Net Volume (cy/yr) ^a			Net Sedimentation Rate (inch/yr)		
			Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile		Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile
RM 0 to 1	1989	2007	34	31	37	5	3	9	40	18,000	15,000	21,000	-1,200	-2,800	-390	17,000	13,000	21,000	3.18	2.43	3.93
RM 1 to 2	1989	2007	48	45	52	16	12	19	64	19,000	18,000	20,000	-2,400	-3,500	-1,500	17,000	14,000	19,000	1.98	1.63	2.21
RM 2 to 3	1989	2007	41	37	45	23	19	27	64	7,200	6,100	8,200	-2,800	-3,900	-2,000	4,300	2,300	6,100	0.50	0.27	0.71
RM 3 to 4	1989	2007	29	26	32	21	17	23	49	5,500	4,600	6,500	-3,400	-4,400	-2,500	2,100	510	3,800	0.32	0.08	0.57
RM 4 to 5	1989	2007	26	23	28	19	17	22	45	5,100	4,400	5,900	-3,600	-4,500	-2,700	1,600	140	3,000	0.26	0.02	0.49
RM 5 to 6	1989	2007	23	20	25	16	14	18	39	3,800	3,200	4,400	-2,400	-3,100	-1,800	1,400	260	2,500	0.27	0.05	0.48
RM 6 to 7	1989	2007	22	19	24	17	15	20	39	3,500	2,900	4,100	-2,800	-3,500	-2,200	660	-500	1,800	0.13	-0.10	0.34
RM 7 to 8	1989	2007	13	11	15	10	8	13	23	1,900	1,300	2,500	-1,700	-2,300	-1,100	210	-830	1,200	0.07	-0.26	0.38
RM 0 to 7	1989	2007	223	218	228	117	111	122	340	62,000	60,000	64,000	-19,000	-21,000	-17,000	43,000	40,000	46,000	0.94	0.88	1.01

Table 11-14c. Deposition and Erosion by River Mile 1989-2007 - Comparison

River Mile	Year Range	Total Area (acres)	Net Volume (cy/yr)				Within Uncertainty Bound	Net Sedimentation Rate (in/yr)				Within Uncertainty Bound
			Point Based Estimate ¹	Conditional Simulation				Point Based Estimate	Conditional Simulation			
				Median	5th Percentile	95th Percentile			Median	5th Percentile	95th Percentile	
RM 0 to 1	1989-2007	39.8	16,000	17,000	13,000	21,000	Yes	2.94	3.12	2.41	3.84	Yes
RM 1 to 2	1989-2007	64.0	17,000	17,000	14,000	19,000	Yes	1.95	1.93	1.67	2.18	Yes
RM 2 to 3	1989-2007	63.6	4,800	4,300	2,300	6,100	Yes	0.56	0.50	0.27	0.71	Yes
RM 3 to 4	1989-2007	49.4	1,500	2,100	510	3,800	Yes	0.23	0.32	0.08	0.57	Yes
RM 4 to 5	1989-2007	45.2	1,500	1,600	140	3,000	Yes	0.25	0.26	0.02	0.49	Yes
RM 5 to 6	1989-2007	38.6	1,100	1,400	260	2,500	Yes	0.22	0.27	0.05	0.48	Yes
RM 6 to 7	1989-2007	39.1	540	660	-500	1,800	Yes	0.10	0.12	-0.10	0.33	Yes
RM 0 to 7	1989-2007	340	42,000	43,000	40,000	46,000	Yes	0.92	0.94	0.88	1.01	Yes

Note:
¹Volume is adjusted based on the conditional simulation analysis total area.

Table 11-15a. Deposition and Erosion by River Mile 2004-2007 - Point Based Estimate

River Mile	River Bottom Area (acres)				Volume (cy/yr)				Sedimentation Rate (in./yr)				Percent of Resuspended Solids in Gross Deposition
	Depositional	Erosional	Neutral	Total	Depositional	Erosional	Neutral	Net	Depositional	Erosional	Neutral	Net	
RM -0.9 to 1	64	4	11	79	73,916	-2,182	390	72,124	8.61	-4.34	0.26	6.82	3%
RM 1 to 2	33	12	21	67	23,002	-5,171	47	17,877	5.12	-3.23	0.02	2	22%
RM 2 to 3	17	21	26	64	8,664	-10,621	151	-1,806	3.77	-3.69	0.04	-0.21	123%
RM 3 to 4	10	17	23	50	3,925	-8,588	-150	-4,813	2.87	-3.65	-0.05	-0.71	219%
RM 4 to 5	12	15	20	47	5,171	-8,348	454	-2,723	3.31	-4.14	0.17	-0.43	161%
RM 5 to 6	9	12	19	40	4,814	-6,473	513	-1,147	3.88	-4.03	0.21	-0.21	134%
RM 6 to 7	5	17	19	40	1,506	-9,317	-217	-8,028	2.36	-4.14	-0.09	-1.48	619%
RM 7 to 8	11	7	20	37	3,746	-3,356	359	749	2.64	-3.84	0.13	0.15	90%
RM 8 to 9	7	5	17	30	2,281	-2,460	582	404	2.38	-3.35	0.25	0.1	108%
RM 9 to 10	8	7	17	31	2,413	-2,549	220	84	2.35	-2.87	0.1	0.02	106%
RM 10 to 11	8	8	18	33	2,536	-3,238	339	-363	2.49	-3.04	0.14	-0.08	128%
RM 11 to 12	8	6	16	29	3,739	-2,687	271	1,323	3.67	-3.29	0.13	0.34	72%
RM 12 to 13	5	7	13	25	1,594	-3,634	554	-1,487	2.31	-3.9	0.31	-0.44	228%
RM 13 to 14	9	6	11	26	3,230	-3,013	196	414	2.78	-3.52	0.14	0.12	93%
RM 14 to 14.45	3	3	4	11	1,782	-1,970	-16	-204	4.2	-4.24	-0.03	-0.14	111%

Data Sources:
 2004 Single Beam Survey, Rogers Surveying, Inc. for USACE
 2007 Multi-Beam Survey, Gahagan & Bryant Associates, Inc. for CPG

Table 11-15b. Deposition and Erosion by River Mile 2004-2007 - Conditional Simulation

RM Range	Depositional Area (acres)			Erosional Area (acres)			Total Area (acres)	Depositional Volume (cy/yr)			Erosional Volume (cy/yr)			Net Volume (cy/yr)			Net Sedimentation Rate (inch/yr)		
	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile		Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile
RM 0 to 1	33	25	38	7	3	15	40	42,637	23,962	63,398	-4,022	-18,294	-1,020	38,252	6,600	61,985	7.05	1.22	11.42
RM 1 to 2	42	35	49	25	17	32	67	27,090	19,041	35,722	-12,308	-18,612	-7,445	14,841	2,827	26,582	1.65	0.31	2.96
RM 2 to 3	29	21	37	35	26	42	64	16,006	10,387	22,241	-18,209	-26,342	-11,485	-2,323	-15,287	10,027	-0.27	-1.79	1.17
RM 3 to 4	22	16	29	28	21	35	50	10,168	5,742	16,006	-14,884	-21,329	-9,071	-4,549	-14,380	5,660	-0.67	-2.13	0.84
RM 4 to 5	21	16	27	25	19	31	46	13,603	8,637	19,520	-18,631	-25,051	-13,870	-5,184	-15,522	4,702	-0.83	-2.49	0.75
RM 5 to 6	19	14	23	20	16	25	39	12,164	8,163	17,429	-11,679	-17,177	-7,569	229	-8,305	8,908	0.04	-1.59	1.71
RM 6 to 7	15	11	20	24	19	28	39	7,725	4,360	11,948	-15,341	-21,011	-10,112	-7,345	-15,747	1,013	-1.39	-2.98	0.19
RM 7 to 8	13	7	17	11	6	16	23	5,996	2,554	11,176	-5,265	-9,900	-2,514	610	-6,763	7,916	0.19	-2.14	2.51
RM 0 to 7	181	173	189	164	156	172	345	131,142	116,392	145,594	-98,294	-107,769	-89,474	33,894	12,820	47,273	0.73	0.28	1.02

Table 11-15c. Deposition and Erosion by River Mile 2004-2007 - Comparison

River Mile	Total Area (acres)	Net Volume (cy/yr)				Within Uncertainty Bound	Net Sedimentation Rate (in./yr)				Within Bound
		Point Based Estimate ¹	Conditional Simulation				Point Based Estimate	Conditional Simulation			
			Median	5th Percentile	95th Percentile			Median	5th Percentile	95th Percentile	
RM 0 to 1	40	36,846	38,252	6,600	61,985	Yes	6.79	7.05	1.22	11.42	Yes
RM 1 to 2	67	17,835	14,841	2,827	26,582	Yes	1.98	1.65	0.31	2.96	Yes
RM 2 to 3	64	-1,796	-2,323	-15,287	10,027	Yes	-0.21	-0.27	-1.79	1.17	Yes
RM 3 to 4	50	-4,843	-4,549	-14,380	5,660	Yes	-0.72	-0.67	-2.13	0.84	Yes
RM 4 to 5	46	-2,690	-5,184	-15,522	4,702	Yes	-0.43	-0.83	-2.49	0.75	Yes
RM 5 to 6	39	-1,113	229	-8,305	8,908	Yes	-0.21	0.04	-1.59	1.71	Yes
RM 6 to 7	39	-7,878	-7,345	-15,747	1,013	Yes	-1.49	-1.39	-2.98	0.19	Yes
RM 0 to 7	345	36,362	33,894	12,820	47,273	Yes	0.78	0.73	0.28	1.02	Yes

Note:
¹Volume is adjusted based on the conditional simulation analysis total area.

Table 11-16a. Summary of Deposition and Erosion: River Section Subtotals 1989 to 2007 - Point Based Estimate

River Mile	Volume (cy/yr)				River Bottom Area (acres)	Net Sedimentation Rate (in./yr)	Percent of Resuspension in Gross Deposition
	Depositional	Erosional	Neutral	Net			
RM -0.9 - 2	52,978	-2,339	-62	50,577	146	2.57	4%
RM 2 - 6	14,084	-6,197	36	7,923	176	0.34	44%
RM 6 - 9	5,049	-4,233	19	834	96	0.06	84%
RM 9 - 12	8,192	-3,007	22	5,208	85	2.95	37%
RM 12 - 14.5	4,727	-5,128	11	-389	56	-0.33	108%
RM -0.9 - 8	70,787	-11,424	-11	59,352	392	1.13	16%
RM 2 - 8	17,809	-9,085	52	8,776	245	0.27	51%
RM 8 -12	9,516	-4,352	25	5,189	112	0.35	46%
RM 8 - 14.45	14,243	-9,479	36	4,801	167	0.21	67%
RM -0.9 -14.45	85,030	-20,903	26	64,153	559	0.85	25%

Data Sources:

1989 Single Beam Survey , Topometric Inc. for USACE.

2007 Multi-Beam Survey, Gahagan & Bryant Associates, Inc. for CPG

Table 11-16b. Summary of Deposition and Erosion: River Section Subtotals 1989 to 2007 - Conditional Simulation

River Mile	Depositional Area (acres)			Erosional Area (acres)			Total Area (acres)	Depositional Volume (cy/yr)			Erosional Volume (cy/yr)			Net Volume (cy/yr)			Sedimentation Rate (in/yr)		
	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile		Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile
RM 0 to 2	83	78	87	21	17	25	104	37,058	34,360	40,162	-3,725	-5,300	-2,448	33,401	29,390	37,112	2.39	2.11	2.66
RM 2 to 7	140	134	146	96	89	102	236	25,042	23,231	26,800	-15,109	-16,786	-13,343	9,957	7,107	12,874	0.314	0.224	0.406
RM 0 to 7	223	218	228	117	111	122	340	62,231	60,091	64,364	-18,886	-20,598	-17,007	43,253	40,450	46,463	0.95	0.89	1.02

Table 11-16c. Summary of Deposition and Erosion: River Section Subtotals 1989 to 2007 - Comparison

River Mile	Total Area (acres)	Point Based Estimate ¹	Net Volume (cy/yr)			Within Uncertainty Bound	Point Based Estimate	Net Sedimentation Rate (in/yr)			Within Uncertainty Bound
			Conditional Simulation					Conditional Simulation			
			Median	5th Percentile	95th Percentile			Median	5th Percentile	95th Percentile	
RM 0 to 2	104	35,973	33,401	29,390	37,112	Yes	2.58	2.39	2.11	2.66	Yes
RM 2 to 7	236	8,451	9,957	7,107	12,874	Yes	0.27	0.31	0.22	0.41	Yes
RM 0 to 7	340	44,424	43,253	40,450	46,463	Yes	0.97	0.95	0.89	1.02	Yes

Note:

¹Volume is adjusted based on the conditional simulation analysis total area.

Table 11-17a. Summary of Deposition and Erosion: River Segment Subtotals 2004 to 2007 - Point Based Estimate

River Mile	Volume (cy/yr)				River Bottom Area (acres)	Net Sedimentation Rate (in./yr)	Percent of Resuspension in Gross Deposition
	Depositional	Erosional	Neutral	Net			
RM 0 - 2	96,918	-7,353	436	90,001	145	4.61	8%
RM 2 - 6	22,573	-34,030	968	-10,489	201	-0.39	151%
RM 6 - 9	7,533	-15,133	724	-6,876	107	-0.48	201%
RM 9 - 12	8,688	-8,474	830	1,044	94	0.08	98%
RM 12 - 14.5	-8,474	830	24,615	16,972	61	-0.15	130%
RM -0.9 - 8	124,744	-54,057	1,546	72,233	424	1.27	43%
RM 2 - 8	27,825	-46,703	1,110	-17,768	279	-0.47	168%
RM 8 -12	10,969	-10,933	1,412	1,448	123	0.09	100%
RM 8 - 14.45	17,574	-19,550	2,146	171	185	0.01	111%
RM -0.9 -14.45	142,318	-73,607	3,692	72,403	609	0.88	52%

Data Sources:

2004 Single Beam Survey, Rogers Surveying, Inc. for USACE

2007 Multi-Beam Survey, Gahagan & Bryant Associates, Inc. for CPG

Table 11-17b. Summary of Deposition and Erosion: River Segment Subtotals 2004 to 2007 - Conditional Simulation

River Mile	Depositional Area (acres)			Erosional Area (acres)			Total Area (acres)	Depositional Volume (cy/yr)			Erosional Volume (cy/yr)			Net Volume (cy/yr)			Sedimentation Rate (in/yr)		
	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile		Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile	Median	5th Percentile	95th Percentile
RM 0 to 2	75	66	84	32	23	41	107	69,866	51,440	91,041	-17,313	-30,970	-10,594	52,765	20,999	78,112	3.66	1.46	5.42
RM 2 to 7	107	95	119	131	119	144	238	60,763	49,068	70,459	-79,829	-92,181	-67,802	-18,667	-39,924	328	-0.583	-1.246	0.010
RM 0 to 7	181	173	189	164	156	172	345	131,142	116,392	145,594	-98,294	-107,769	-89,474	33,894	12,820	47,273	0.73	0.28	1.02

Table 11-17c. Summary of Deposition and Erosion: River Segment Subtotals 2004 to 2007 - Comparison

River Mile	Total Area (acres)	Point Based Estimate ¹	Net Volume (cy/yr)			Within Uncertainty Bound	Net Sedimentation Rate (in/yr)			Within Uncertainty Bound	
			Conditional Simulation				Conditional Simulation				
			Median	5th Percentile	95th Percentile		Median	5th Percentile	95th Percentile		
RM 0 to 2	107	66,498	52,765	20,999	78,112	Yes	4.62	3.66	1.46	5.42	Yes
RM 2 to 7	238	-15,180	-18,667	-39,924	328	Yes	-0.47	-0.58	-1.25	0.01	Yes
RM 0 to 7	345	51,318	33,894	12,820	47,273	No	1.11	0.73	0.28	1.02	No

Note:

¹Volume is adjusted based on the conditional simulation analysis total area.

Table 11-18: Sediment Texture by River Mile 1989-2007

Silt											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solid in Gross Deposition	Percent of Resuspended Solid by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	70154	235	6.3	-8082	70	-2.43	64.2	52.65	0.03	12%	100%
RM -0.9 to 2	52103	105	10.42	-1368	13	-2.19	-1.27	9.38	0	3%	17%
RM 2 to 8	15243	112	2.86	-5752	51	-2.37	61.88	40.75	0.03	38%	71%
RM 8 to 12	2542	15	3.48	-914	5	-3.63	3.59	2.52	0.03	36%	11%
RM 12 to 14.45	265	2	3.63	-49	0	-3.34	0	0	NA	18%	1%

Silt and Sand											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solid in Gross Deposition	Percent of Resuspended Solid by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	4935	28	3.75	-5916	29	-4.27	4.67	8.74	0.01	120%	100%
RM -0.9 to 2	779	4	4.57	-334	3	-2.3	-8.04	1.63	-0.1	43%	6%
RM 2 to 8	1789	9	4.29	-2113	12	-3.71	-0.17	4.77	0	118%	36%
RM 8 to 12	454	2	4.74	-236	1	-4.28	-0.61	0.52	-0.02	52%	4%
RM 12 to 14.45	1912	13	3.03	-3233	13	-5.25	13.5	1.82	0.16	169%	55%

Sand											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solid in Gross Deposition	Percent of Resuspended Solid by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	3474	27	2.75	-1262	11	-2.52	13.54	8.56	0.03	36%	100%
RM -0.9 to 2	0	0	NA	0	0	NA	0	0	NA	NA	0%
RM 2 to 8	70	1	2.19	-109	1	-2.09	-1.73	0.75	-0.05	155%	9%
RM 8 to 12	2582	21	2.58	-788	8	-2.15	18.68	6.9	0.06	31%	62%
RM 12 to 14.45	822	5	3.57	-364	2	-4.44	-3.42	0.92	-0.08	44%	29%

Table 11-18: Sediment Texture by River Mile 1989-2007

Sand and Gravel											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solid in Gross Deposition	Percent of Resuspended Solid by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	5150	31	3.48	-4412	29	-3.26	0.41	11.53	0	86%	100%
RM -0.9 to 2	5	0	2.03	-5	0	-1.89	0	0	NA	93%	0%
RM 2 to 8	571	3	4.36	-906	6	-3.07	-8.28	1.45	-0.12	159%	21%
RM 8 to 12	3196	21	3.22	-2178	16	-2.95	4.49	8.13	0.01	68%	49%
RM 12 to 14.45	1379	7	3.92	-1323	7	-4.17	4.21	1.96	0.05	96%	30%

Coarse Gravel and Rock											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solid in Gross Deposition	Percent of Resuspended Solid by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	1266	5	4.98	-574	3	-4.42	-4.64	0.91	-0.11	45%	100%
RM -0.9 to 2	79	0	7.39	-4	0	-1.78	-0.64	0.08	-0.18	5%	1%
RM 2 to 8	132	1	2.64	-201	1	-4.08	-0.03	0.22	0	153%	35%
RM 8 to 12	715	3	5.38	-213	1	-4.44	-1.07	0.45	-0.05	30%	37%
RM 12 to 14.45	340	1	5.62	-155	1	-5.15	-2.89	0.17	-0.36	46%	27%

Data Sources:

1989 Single Beam Survey, Topometric Inc. for USACE.

2007 Multi-Beam Survey, Gahagan & Bryant Associates, Inc. for CPG

2005 Side Scan Sonar, Aqua Survey, Inc.

Table 11-19: Sediment Texture by River Mile 2004-2007

Silt											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solids in Gross Deposition	Percent of Resuspended Solids by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	118858	151	16.54	-51090	101	-10.71	1176.02	141.52	0.18	43%	100%
RM -0.9 to 2	95628	95	21.23	-7308	15	-9.95	393.78	31.24	0.27	8%	14%
RM 2 to 8	21107	50	8.9	-39917	76	-11.08	667.47	97.03	0.14	189%	78%
RM 8 to 12	2114	7	6.8	-2892	7	-8.2	123.71	13.11	0.2	137%	6%
RM 12 to 14.45	9	0	9.6	-973	2	-11.85	-8.95	0.14	-1.35	10739%	2%

Silt and Sand											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solids in Gross Deposition	Percent of Resuspended Solids by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	8224	20	8.5	-7023	16	-9.54	690.36	32.38	0.45	85%	100%
RM -0.9 to 2	1063	2	11.17	-43	0	-5.89	41.76	0.97	0.91	4%	1%
RM 2 to 8	2814	8	7.9	-3529	8	-9.79	202.87	16.29	0.26	125%	50%
RM 8 to 12	427	0	30.6	-732	2	-9.65	-42.03	1.75	-0.51	171%	10%
RM 12 to 14.45	3919	11	7.81	-2719	6	-9.29	487.75	13.38	0.77	69%	39%

Sand											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solids in Gross Deposition	Percent of Resuspended Solids by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	6720	17	8.25	-2637	6	-8.64	952.78	25.97	0.77	39%	100%
RM -0.9 to 2	0	0	NA	0	0	NA	0	0	NA	NA	0%
RM 2 to 8	258	1	6.1	-193	1	-7.83	96.91	1.81	1.13	75%	7%
RM 8 to 12	5060	14	7.8	-1728	4	-8.46	786.7	20.55	0.81	34%	66%
RM 12 to 14.45	1401	3	11.39	-717	2	-9.39	69.18	3.62	0.4	51%	27%

Table 11-19: Sediment Texture by River Mile 2004-2007

Sand and Gravel											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solids in Gross Deposition	Percent of Resuspended Solids by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	7531	16.5	9.63	-9511	20.3	-9.87	880.49	49.54	0.37	126%	100%
RM -0.9 to 2	132	0.1	20.94	0	0	NA	1.89	0.02	1.8	0%	0%
RM 2 to 8	3417	4.5	15.99	-1591	3.8	-8.94	114.52	10.02	0.24	47%	17%
RM 8 to 12	2969	8.5	7.33	-4534	10.6	-9.03	555.16	29.83	0.39	153%	48%
RM 12 to 14.45	1013	7.9	2.7	-3386	6	-11.93	208.92	9.67	0.46	334%	36%

Coarse Gravel and Rock											
River Mile	Depositional			Erosional			Neutral			Percent of Resuspended Solids in Gross Deposition	Percent of Resuspended Solids by River Segment
	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)	Volume (cy/year)	River Bottom Area (Acres)	Sedimentation Rate (in/yr)		
RM -0.9 to 14.45	986	2	10.17	-3318	5	-14.81	-2.47	4.7	-0.01	337%	100%
RM -0.9 to 2	109	0	10.43	-7	0	-6.72	1.09	0.15	0.15	6%	0%
RM 2 to 8	221	1	8.35	-1473	1	-22.7	24.96	1.41	0.37	668%	44%
RM 8 to 12	393	1	9.94	-1004	2	-10.29	-11.96	2.03	-0.12	256%	30%
RM 12 to 14.45	263	0	12.78	-833	1	-13.79	-16.55	1.12	-0.31	317%	25%

Data Sources:

2004 Single Beam Survey, Rogers Surveying, Inc. for USACE

2007 Multi-Beam Survey, Gahagan & Bryant Associates, Inc. for CPG

2005 Side Scan Sonar, Aqua Survey, Inc.

Table 11-20: Percentage of resuspended fine grained sediment- 1989-2007 Scenario 1

River Mile	Fine Grained Sediment Volume (cy)				% of resuspended fine grained sediment based on total fined grained sediment	% of resuspended fine grained sediment based on fined grained sediment below RM 12
	Depositional	Erosional	Neutral	Net		
RM -0.9 - 8	1,140,556	149,931	880	991,506	70 %	88.0%
RM 8 - 12	53,913	20,438	86	33,561	9 %	12 %
RM > 12	31,780	44,779	173	-12,826	21 %	26 %
RM-0.9-12	344,748	170,369	967	1,025,066	79 %	100 %
RM-0.9 -14.5	1,226,249	215,148	1,139	1,012,240	100 %	--

Table 11-21: Percentage of resuspended fine grained sediment- 2004-2007 Scenario 1

River Mile	Fine Grained Sediment Volume (cy)				% of resuspended fine grained sediment based on total fined grained sediment	% of resuspended fine grained sediment based on fined grained sediment below RM 12
	Depositional	Erosional	Neutral	Net		
RM -0.9 - 8	305,931	127,991	3,244	181,184	88 %	93 %
RM 8 - 12	7,894	9,681	483	-1,305	7 %	7 %
RM > 12	8,543	8,510	1,010	1,043	6 %	6 %
RM-0.9-12	313,825	137,672	3,727	179,880	94 %	100 %
RM-0.9-14.5	322,368	146,182	4,737	180,922	100 %	--

Table 11-22: Percentage of resuspended fine grained sediment- 1989-2007 Scenario 2

River Mile	Fine Grained Sediment Volume (cy)				% of resuspended fine grained sediment based on total fine grained sediment	% of resuspended fine grained sediment based on fine grained sediment below RM 12
	Depositional	Erosional	Neutral	Net		
RM -0.9 - 8	1,120,403	130,727	944	990,621	77 %	88 %
RM 8 - 12	50,347	18,587	91	31,850	11 %	12 %
RM > 12	16,773	19,409	67	-2,569	12 %	13 %
RM-0.9-12	1,170,750	149,314	1,036	1,022,471	88 %	100 %
RM-0.9-14.5	1,187,523	168,723	1,103	1,019,902	100 %	--

Table 11-23. Percentage of resuspended fine grained sediment- 2004-2007 Scenario 2

River Mile	Fine Grained Sediment Volume (cy)				% of resuspended fine grained sediment based on total fine grained sediment	% of resuspended fine grained sediment based on fine grained sediment below RM 12
	Depositional	Erosional	Neutral	Net		
RM -0.9 - 8	301,208	123,639	2,946	180,515	90 %	93 %
RM 8 - 12	7,373	8,789	534	-882	6 %	7 %
RM > 12	3,768	5,197	415	-1,014	4 %	4 %
RM-0.9-12	308,581	132,428	3,480	179,633	96 %	100 %
RM-0.9-14.5	312,349	137,625	3,895	178,619	100 %	--

Table 11-24: Historic Cores Classified by Depositional Setting

Location ID	Average Sedimentation Rate	DESCRIPTION
63	-2.31	Non-Depositional
64	1.76	Non-Depositional
65	-2.5	Non-Depositional
66	3.99	Lack Data
67	-1.04	Non-Depositional
68	-0.46	Generally Depositional
69	0.33	Erosive
70	0.72	Erosive
71	0.54	Generally Depositional
72	1.25	Erosive
73	0.42	Data Mess
74	0.71	Generally Depositional
76	-1.64	Lack Data
77	0.79	Non-Depositional
80	-0.12	Non-Depositional
106	4.62	Recently Depositional
111	-1.33	Lack Data
113	-1.63	Non-Depositional
114	-0.41	Lack Data
119	-0.17	Data Mess
120	3	Data Mess
121	0.1	Non-Depositional
122	-1	Recently Depositional
123	6.82	Data Mess
124	0.82	Data Mess
125	0.83	Erosive
126	0.49	Data Mess
127	-2.34	Lack Data
178	0.25	Generally Depositional
179	10.01	Data Mess
182	3.08	Recently Depositional
183	0.01	Recently Depositional
184	5.8	Lack Data
185	2.79	Generally Depositional
186	1.5	Generally Depositional
187	2.86	Generally Depositional
188	0.27	Erosive
189	1.13	Non-Depositional
190	-3.5	Erosive
191	-4.14	Erosive
192	2.8	Non-Depositional
193	-2.36	Erosive
194	2.81	Generally Depositional

Table 11-24: Historic Cores Classified by Depositional Setting

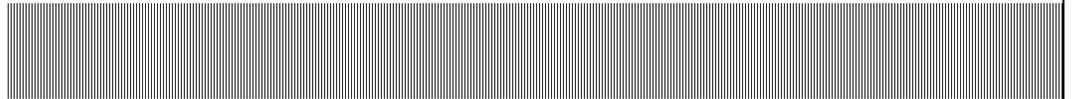
Location ID	Average Sedimentation Rate	DESCRIPTION
195	0.22	Data Mess
196	-0.87	Data Mess
197	-3.14	Generally Depositional
199	0.65	Generally Depositional
200	1.78	Generally Depositional
201	-0.32	Non-Depositional
202	2.61	Non-Depositional
203	0.95	Erosive
204	3.1	Erosive
205	2.14	Erosive
206	-0.83	Generally Depositional
207	-2.14	Non-Depositional
208	-2.24	Generally Depositional
209	-1.19	Erosive
210	-0.38	Generally Depositional
211	0.61	Erosive
212	5	Erosive
213	1.88	Non-Depositional
214	0.81	Generally Depositional
215	-1.98	Erosive
216	-0.81	Generally Depositional
217	-0.51	Generally Depositional
218	-3.39	Generally Depositional
219	-0.51	Non-Depositional
220	0.11	Generally Depositional
221	-1.03	Data Mess
222	-1.91	Generally Depositional
223	-1.77	Erosive
224	-1.03	Generally Depositional
225	-1.06	Generally Depositional
226	-0.4	Recently Depositional
227	-2.51	Non-Depositional
228	0.2	Generally Depositional
229	0.01	Generally Depositional
230	-1.6	Generally Depositional
231	-0.2	Generally Depositional
232	-1.7	Erosive
233	-2.84	Non-Depositional
234	-1.44	Data Mess
235	0.07	Generally Depositional
236	-2.84	Erosive
237	-4.06	Recently Depositional
238	-0.21	Generally Depositional

Table 11-24: Historic Cores Classified by Depositional Setting

Location ID	Average Sedimentation Rate	DESCRIPTION
239	-3.48	Generally Depositional
240	-2.36	Generally Depositional
241	-1.11	Generally Depositional
243	-0.98	Generally Depositional
244	-2.93	Generally Depositional
245	-5.03	Erosive
246	-1.61	Non-Depositional
249	-3.75	Generally Depositional
250	-2.69	Erosive
252	-1.36	Data Mess
253	0.22	Recently Depositional
254	0	Erosive
255	-0.62	Generally Depositional
256	0.32	Lack Data
257	0.66	Non-Depositional
258	0.24	Data Mess
259	0.37	Non-Depositional
260	-0.19	Data Mess
261	-0.36	Non-Depositional
262	0.97	Recently Depositional
263	0.15	Non-Depositional
264	1.02	Recently Depositional
265	-0.57	Generally Depositional
266	-0.65	Generally Depositional
267	-0.52	Erosive
268	-2.94	Generally Depositional
269	-3.45	Generally Depositional
270	-3.71	Generally Depositional
271	-3.2	Erosive
272	-4.57	Generally Depositional
273	-3.58	Generally Depositional
274	-1.26	Generally Depositional
282	-1.58	Lack Data
283	-0.74	Lack Data
286	-0.15	Lack Data
287	0.56	Lack Data
288	0.11	Lack Data
291	0.51	Lack Data

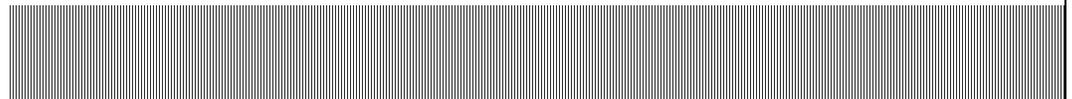
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Section V



Chapter 12 Tables

There are no tables associated with this chapter.



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Chapter 13 Tables

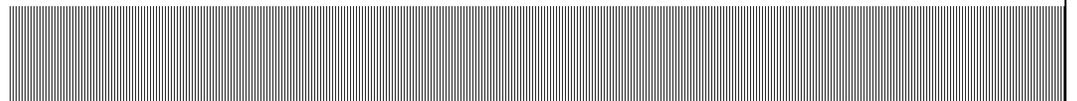


Table 13-1: Locations of Complete Cesium-137 Profiles

Tierra Solutions, Inc. Location	X-Coordinate	Y-Coordinate	River Mile	Depth of Sediment Sampled (feet) ^a
TSI 209	598198	691320	1.46	5.5
TSI 222	595563	695459	2.65	13.6
TSI 228	593188	695244	3.10	11
TSI 230	593149	695455	3.10	7.2
TSI 286	593249	695021	3.10	5.6
TSI 232	592028	694972	3.33	6
TSI 235	591151	694213	3.55	7.2
TSI 241	589595	692519	4.01	11.9
TSI 248	587218	692459	4.47	14.8
TSI 251	586182	693013	4.70	8.5
TSI 253	585542	693974	4.92	5.5
TSI 272	585243	701014	6.27	10.5
TSI 296	585527	701638	6.40	5.6
TSI 275	585643	702116	6.49	7

a: Depth represents bottom of last core segment sampled for either radiological or analytical samples. This depth does not necessarily represent the total coring depth since segmentation of the core extended only to the 1940 time horizon [Field Sampling Plan (Tierra Solutions, Inc., 1995a)].

Table 13-2: LWA Concentrations for Select Contaminants

Analyte	LWA Concentration
Mercury (mg/kg)	5.7
Lead (mg/kg)	420
Cadmium (mg/kg)	11
Trans-Chlordane (µg/kg)	44
DDE (µg/kg)	200
2,3,7,8-TCDD (ng/kg) ^a	3,600
Total TCDD (ng/kg) ^a	4,100
BZ 31 (µg/kg) ^a	270
BZ 52 (µg/kg) ^a	270
BZ 61+66+70+74+76 (µg/kg) ^a	640
BZ 83+99 (µg/kg) ^a	110
BZ 90+101+113 (µg/kg) ^a	180
BZ 93+95+98+100+102 (µg/kg) ^a	150
BZ 110+111+115 (µg/kg) ^a	190
BZ 129+138+158+160+163+164 (µg/kg) ^a	170
BZ 139+140+147+149 (µg/kg) ^a	130
BZ 170 (µg/kg) ^a	33
BZ 180+193 (µg/kg) ^a	80
Benz[a]anthracene (mg/kg)	3.7
Benzo[a]pyrene (mg/kg)	3.7
Chrysene (mg/kg)	5.1
Fluoranthene (mg/kg)	8.2
Indeno[1,2,3-cd]pyrene (mg/kg)	2.6
Pyrene (mg/kg)	7.9

a: Average concentration for only three river locations (RM1.4, RM2.2, and RM11)
Concentrations rounded to two significant figures

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Chapter 14 Tables

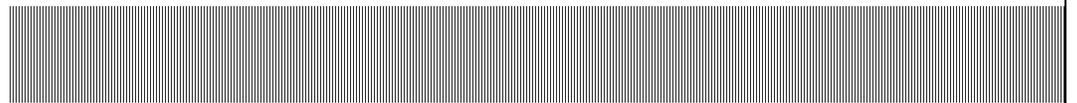


Table 14-1: Summary of Surficial Sediment Concentrations from Dundee Dam to Newark Bay

Analyte	Newark Bay 2005 ^{a,b}	Lower Passaic River 1995 ^{a,c}	Lower Passaic River 2005-2008 ^{a,d}	Dundee Dam Sediment Core Top (2005-2007 time horizon) ^a
Cadmium (mg/kg)	2.3 ±3.4 (N = 67)	5.1 ±3.1 (N = 95)	3.6 ±0.54 (N = 19)	1.50 ±0.40 (N =11)
Copper (mg/kg)	150 ±130 (N = 67)	230 ±250 (N = 95)	160 ±27 (N = 19)	63 ±12 (N =11)
Lead (mg/kg)	160 ±160 (N = 67)	330 ±150 (N = 90)	200 ±25 (N = 19)	130 ±23 (N =11)
Mercury (mg/kg) ^f	3.4 ±9.5 (N = 67)	3.3 ±1.9 (N = 92)	1.9 ±0.40 (N = 19)	0.72 ±0.39 (N =11)
Total PCB (µg/kg) ^g	750 ±1,100 (N = 67)	1,300 ±1,800 (N = 90)	1,200 ±190 (N = 10)	460 ±190 (N =8)
2,3,7,8-TCDD (ng/kg)	64 ±80 (N = 67)	830 ±2,000 (N = 95)	370 ±120 (N = 10)	1.9 ±0.63 (N =9)
Ratio of 2,3,7,8- TCDD/Total TCDD	0.4 ±0.1 (N = 67)	0.7 ±0.1 (N = 95)	0.69 ±0.05 (N = 10)	0.05 ±0.01 (N =9)

a: Arithmetic average and standard deviation (± 1 sigma) based on a normal distribution of sample size; nondetected values are incorporated into the average as half the reported detection limit. Results rounded to two significant figures, whenever possible.

b: The 2005 TSI Newark Bay dataset represents surficial sediment (0 to 6 inches) collected from net depositional and net non-depositional sampling locations.

c: The 1995 TSI Lower Passaic River dataset represents surficial sediment (0 to 6 inches) collected from net depositional and net non-depositional sampling locations.

d: The 2005 Malcolm Pirnie, Inc. dataset represents surficial sediment dating from 2003-2005 based on the estimated age of the surface layers and 2007-2008 surface sediment data are used.

e: This average excludes the one elevated value in Port Newark of 77 mg/kg.

f: Total PCB for the 2005 Newark Bay data and the 2005 Lower Passaic River data were calculated as the sum of congeners, (209 congeners and 159 congeners, respectively). The 1995 Lower Passaic River data and the Dundee Dam data represent the sum of Aroclors.

Table 14-2: Summary Statistics of 1999-2000 Near-shore Data

	Copper (ng/g)	Lead (ng/g)	Mercury (ng/g)	Sum HMW (ng/g)	Sum LMW (ng/g)	4,4'-DDD (ng/g)	4,4'-DDE (ng/g)	4,4'-DDT (ng/g)	Dieldrin (ng/g)	Total Chlordane (ng/g)	2,3,7,8-TCDD (pg/g)	Total PCB (sum of 10 congeners) (mg/kg)	PCB TEQ (1998 Mammal) (mg/kg)	PCB TEQ (2005 Mammal) (mg/kg)	PCB TEQ (Fish) (mg/kg)	PCB TEQ (Bird) (mg/kg)
Count	77	77	77	74	74	77	77	77	77	77	75	77	77	77	77	77
Minimum	78,700	101,000	910	17,700	2,480	0	5	0	3	2	0	12	0.007	0.002	0.001	0.099
Maximum	807,000	824,000	21,600	131,000	35,200	224	314	1,080	38	117	4,330	410	0.289	0.331	0.015	2.24
Mean	203,000	274,000	3,070	36,100	5,820	44	45	75			403	92	0.078	0.080	0.005	0.589
Median	194,000	265,000	2,700	34,300	5,390	31	38	41	10	9	296	79	0.065	0.067	0.004	0.538
Std. Dev.	82,100	98,800	2,450	14,500	3,740	41	45	134			541	56	0.057	0.066	0.003	0.298
Std. Error	9,350	11,300	279	1,680	435	5	5	15			62	6	0.007	0.008	0.0003	0.034
Number of Non Detects (U)¹	0	0	0	0	0	17	17	18	77	75	0	97	171	171	171	171
Number of Rejected Samples (R)	0	0	0	0	0	1	0	2	0	0	0	6	11	11	11	11

Note:

1. Inclusion of Non-detects and Rejections:

DDD, DDE, DDT, Dieldrin - Non-detects are included in the statistics at the detection levels.

Total Chlordane - In every case, both alpha and gamma compounds were non-detected, so the number used in the statistics is half of the maximum detection limit.

Sum of 10 PCB Congeners - Reported numbers of non-detects are across all the congeners included. There were 77 samples, each analyzed for 10 congeners, making a total of 770 values, of which 97 were non-detect and 6 were rejected. Rejections were included as zero; non-detects were included at the detection limit

PCB TEQs - Reported numbers of non-detects are across all the congeners included. There were 77 samples, each analyzed for 12 congeners, making a total of 924 values, of which 171 were non-detect and 11 were rejected. Rejections were included in the statistics as zero; non-detects were included at the detection limit.

Table 14-3: Ratio of 2,3,7,8-TCDD/Total TCDD Measured on Suspended Solids

Analyte ^a	Average Surface Sediment	Average USGS TOPS	Infiltrax Program	TOPS Laboratory
2,3,7,8-TCDD (µg/kg)	0.28 ±0.079 (N = 3)	0.57 ±0.57 (N = 18)	0.22 (N = 1)	0.17 (N = 1)
Total TCDD (µg/kg)	0.42 ±0.11 (N = 3)	0.78 ±0.62 (N = 18)	0.32 (N = 1)	0.25 (N = 1)
Ratio 2,3,7,8-TCDD/Total TCDD	0.65 ±0.024 (N = 3)	0.72 ±0.15 (N = 18)	0.69 (N = 1)	0.68 (N = 1)

a: Arithmetic average and standard deviation (± 1 sigma) based on a normal distribution of sample size. .
N = sample size

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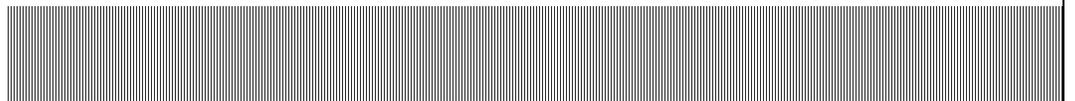


Table 15-1: Metals Ratio in Surface Sediments of the Lower Passaic River

River Location	Mercury/Lead	Cadmium/Lead	Copper/Lead
RM1.4	0.011	0.017	0.73
RM2.2	0.007	0.016	0.63
RM7.8	0.010	0.017	0.73
RM11	0.009	0.019	0.76
RM12.6	0.005	0.015	0.67

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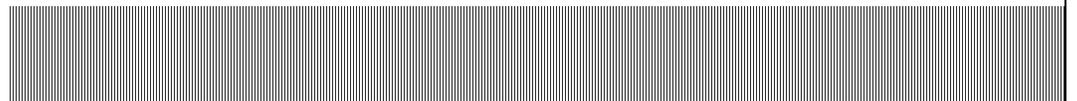


Table 16-1: Data Sources for MPA Calculations

Analyte	Sample Collection Year / Sponsoring Organization	Name of Study in Project Database
Total DDT	1991/USEPA	1991 Core Sediment Investigation
	1993/USEPA	1993 Core Sediment Investigation - 01 (March)
	1993/USEPA	1993 Core Sediment Investigation - 02 (July)
	1995/Tierra Solutions, Inc.	1995 Remedial Investigation Sampling Program
	1995/USACE	1995 USACE Minish Park Investigation
2,3,7,8-TCDD	1991/USEPA	1991 Core Sediment Investigation
	1993/USEPA	1993 Core Sediment Investigation - 01 (March)
	1993/USEPA	1993 Core Sediment Investigation - 02 (July)
	1995/Tierra Solutions, Inc.	1995 Remedial Investigation Sampling Program
Mercury	1991/USEPA	1991 Core Sediment Investigation
	1993/USEPA	1993 Core Sediment Investigation - 02 (July)
	1995/Tierra Solutions, Inc.	1995 Remedial Investigation Sampling Program
	1995/USACE	1995 USACE Minish Park Investigation
Total PCB	1991/USEPA	1991 Core Sediment Investigation
	1993/USEPA	1993 Core Sediment Investigation - 01 (March)
	1993/USEPA	1993 Core Sediment Investigation - 02 (July)
	1995/Tierra Solutions, Inc.	1995 Remedial Investigation Sampling Program

Table 16-2: Summary of Analyte-Specific Threshold for Core Classification

Analyte	Approximate Background (µg/kg)	Selected Threshold (µg/kg)	Percent Nondetected Values Below Threshold ^a	Percent Detected Values Below Threshold ^a
Mercury	200 ^b	200	75 percent	5.0 percent
2,3,7,8-TCDD	0 ^c	0.002	95 percent	2.0 percent
Total PCB	0 ^d	125	95 percent	2.5 percent
Total DDT	0 ^d	10	95 percent	2.5 percent

a: Refer to Appendix A for histograms

b: Background mercury concentration from Bopp *et al.*, 2006

c: Historical analytical methods were not intended to detect background levels of 2,3,7,8-TCDD. Zero assumed as background concentration for this analysis.

d: Both Total PCB and Total DDT are man-made compounds and do not occur naturally in the environment. Zero assumed as background concentration.

Table 16-3: Core Categories for Estimation of Sediment Inventories

Core Category	Total DDT Count ^a (percent)	2,3,7,8-TCDD Count ^a (percent)	Mercury Count ^a (percent)	Total PCB Count ^a (percent)
Bottom Concentration below reporting limit	41 (34 percent)	23 (21 percent)	32 (28 percent)	70 (61 percent)
Concentration decreasing at depth	36 (30 percent)	59 (54 percent)	28 (24 percent)	14 (12 percent)
Concentration elevated or increasing at depth	43 (36 percent)	27 (25 percent)	56 (48 percent)	30 (26 percent)
Total	120 (100 percent)	109 (100 percent)	116 (100 percent)	114 (100 percent)

a: Core count based on 1991 and 1995 data.

Table 16-4: Total Contaminant Mass Sorted by Sediment Texture

Sediment Texture	Total DDT Mass (kg) ^a	2,3,7,8-TCDD Mass (kg) ^a	Mercury Mass (kg) ^a	Total PCB Mass (kg) ^a
Coarse Material	150	1.4 ^b	2,700	500 ^b
Sand	4.0 ^b	0.92 ^b	130 ^b	67 ^b
Silt/Sand	150	0.88	1,200	430
Silt	6,100	17	20,000	5000

a: MPA calculation covers RM1 to RM7; values rounded to two significant figures.

b: MPA calculation based on less than two data points.

Table 16-5: Total Contaminant Mass Sorted by Core Classification

Core Classification	Total DDT Mass (kg) and Percent ^a	2,3,7,8-TCDD Mass (kg) and Percent ^a	Mercury Mass (kg) and Percent ^a	Total PCB Mass (kg) and Percent ^a
Bottom Concentration below reporting limit	190 (3.0 percent)	0.7 (3.6 percent)	6,300 (27 percent)	2,900 (48 percent)
Concentration decreasing at depth	2,300 (36 percent)	14 (69 percent)	6,000 (25 percent)	990 (16 percent)
Concentration elevated or increasing at depth	4,000 (62 percent)	5.4 (28 percent)	11,000 (48 percent)	2,200 (36 percent)

a: MPA calculation covers RM1 to RM7; values rounded to two significant figures.

Table 16-6: Volume-weighted Average Concentrations

Sediment Texture	Total DDT (mg/kg) ^a	2,3,7,8-TCDD (mg/kg) ^a	Mercury (mg/kg) ^a	Total PCB (mg/kg) ^a
Coarse Material	0.37	0.0071	4.3	3.9
Sand	0.29	0.0042	9.8	4.9
Silt/Sand	0.54	0.0032	4.6	2.4
Silt	2.8	0.0070	8.0	2.8
Core Classification	Total DDT (mg/kg)	2,3,7,8-TCDD (mg/kg)	Mercury (mg/kg)	Total PCB (mg/kg)
Bottom Concentration below reporting limit	0.28	0.0010	8.3	2.4
Concentration decreasing at depth	2.0	0.0077	5.4	3.4
Concentration elevated or increasing at depth	4.0	0.011	7.6	3.6

a: MPA calculation covers RM1 to RM7; values rounded to two significant figures.

Table 16-7: Extrapolated Depth of contamination, Contaminant Mass, and Sediment Volume

Analyte	Average Depth of Contamination (feet) a	Volume of Sediment (cubic yards) a	Extrapolated Depth of Contamination (feet) a,b	Extrapolated Contaminant Mass (kg) a,b	Extrapolated Volume of Sediment (cubic yards) a,b
Total DDT	7.4	4.5 million	11	11,000	6.6 million
2,3,7,8-TCDD	8.0	4.9 million	11	29	6.5 million
Total PCB	5.7	3.5 million	7.6	8,000	4.7 million
Mercury	8.6	5.3 million	13	37,000	8.0 million

a: MPA calculation covers RM1 to RM7; values rounded to two significant figures.

b: Extrapolated values calculated by increasing the depth by 25 percent for “contaminant concentrations decreasing at depth” and doubling the depth for “contaminant concentrations elevated or increasing at depth.”

Table 16-8: Summary of Contaminant Inventory Estimates

Inventory Estimate a	Total DDT (Metric ton) b	2,3,7,8-TCDD (kg) b	Mercury (Metric ton) b	Total PCB (Metric ton) b
Interpolated	6.4	20	24	6
Extrapolated	11	29	37	8
Percent Increase c	72 percent	45 percent	54 percent	33 percent

a: See text for discussion.

b: Estimates rounded to two significant figures (when appropriate); 2,3,7,8-TCDD is in units of kilograms.

c: Percent increase is relative to the interpolated mass estimate.

Table 16-9: Estimated Mass and Estimated Volume of Mercury-Contaminated Sediments

Analyte	Average Extrapolated MPA (g/m ²)	Extrapolated Mercury Mass (kilograms)	Average Extrapolated Depth (feet)	Extrapolated Volume of Sediment (cubic yards)
RM0 to RM0.9	23	7,400	14	1,800,000
RM0.9 to RM7	19	37,000	13	6,500,000
RM7 to RM8	22	5,500	12	1,200,000
Total RM0 to RM8	20	50,000	13	9,500,000
RM8 to RM15 a	14	4,900	11	1,500,000
RM8 to RM15 b	5.2	1,800	4	550,000

a: Values were calculated for the fine-grained sediments only by assuming the average extrapolated mass per unit area and depth of contamination from RM6 to RM7. The inventory in the coarse-grained sediment was not calculated.

b: Values were calculated assuming average depth of contamination of approximately 4 feet based on the geotechnical and high resolution cores collected above RM8.

Table 16-10: Estimated Mass and Estimated Volume of 2,3,7,8-TCDD-Contaminated Sediments

Analyte	Average Extrapolated MPA (mg/m ²)	Extrapolated 2,3,7,8-TCDD Mass (kilograms)	Average Extrapolated Depth (feet)	Extrapolated Volume of Sediment (cubic yards)
RM0 to RM0.9	6.5	2	12	1,500,000
RM0.9 to RM7	19	29	11	6,500,000
RM7 to RM8	11	2.4	7.8	660,000
Total RM0 to RM8	16	33	11	8,700,000
RM8 to RM15 ^a	8.5	2.9	11	1,200,000
RM8 to RM15 ^b	3.1	1.1	4	550,000

a: Values were calculated for the fine-grained sediments only by assuming the average extrapolated mass per unit area and depth of contamination from RM6 to RM7. The inventory in the coarse-grained sediment was not calculated.

b: Values were calculated assuming average depth of contamination of approximately 4 feet based on the geotechnical and high resolution cores collected above RM8.

Table 16-11: Summary of MPA Estimates for Individual Low-Resolution Sediment Cores Above RM8

Analyte	Estimated MPA ^a		
	Minimum	Median	Maximum
Total DDT (g/m ²)	0.030	0.17	2.3
2,3,7,8-TCDD (mg/m ²)	0.013	0.79	24
Total PCB (g/m ²)	0.25	1.7	36
Mercury (g/m ²)	0.66	5.5	28

a: Values rounded to two significant figures.

Table 16-12: Summary of Measured and Extrapolated MPA Estimates Below RM8

Analyte	MPA Estimate Based on Measured Data ^a			MPA Estimated Based on Extrapolated Cores ^a		
	Minimum	Median	Maximum	Minimum	Median	Maximum
Total DDT (g/m ²)	0.0025	0.45	3100	0.002	0.62	6300
2,3,7,8-TCDD (mg/m ²)	0.0016	2.4	1300	0.002	3.4	2600
Total PCB (g/m ²)	0.014	2.2	35	0.018	3.6	35
Mercury (g/m ²)	0.069	9.7	64	0.069	15	107

a: Values rounded to two significant figures.

Table 16-13: Results of Median Test Comparing MPA Estimates Above and Below RM8

Analyte	Chi Square for Median Test Comparing MPA Estimates Above RM8 and MPA Estimates (Based on Measured Data) Below RM8 ^a	Chi Square for Median Test Comparing MPA Estimates Above RM8 and MPA Estimates (Based on Extrapolated Cores) Below RM8 ^a
Total DDT	0.32	0.044
2,3,7,8-TCDD	0.033	0.033
Total PCB	0.84	0.25
Mercury	0.11	0.037

a: Values rounded to two significant figures. Results indicating statistically different medians are in bold.

Table 16-14: Estimated Contaminant Inventory Above RM8

River Mile	Sediment Texture	Total DDT (Metric tons) ^{a, b}	2,3,7,8-TCDD (kg) ^{a, b}	Total PCB (Metric tons) ^{a, c}	Mercury (Metric tons) ^{a, c}
RM8 to RM12	Silt	0.083	0.68	0.87	1.5
	Silt/Sand	0.016	0.13	0.16	0.28
	Total	0.099	0.81	1.0	1.8
RM8 to RM15	Silt	0.087	0.72	0.91	1.6
	Silt/Sand	0.092	0.75	0.95	1.6
	Total	0.18	1.5	1.9	3.2

a: Values rounded to two significant figures.

b: Inventory estimates above RM8 for Total DDT and 2,3,7,8-TCDD are best represented by RM8 to RM12 since the most significant sources of these contaminants are in the Lower Passaic River. See text for discussion.

c: Inventory estimates above RM8 for Total PCB and mercury are best represented by estimates in RM8 to RM15 since it appears that significant loading of these contaminants is derived from the Upper Passaic River. See text for discussion.

Table 16-15: Comparison of Inventory Estimates Above and Below RM8

River Mile	Estimated Inventory	Total DDT (Metric tons) ^{a, b}	2,3,7,8-TCDD (kg) ^{a, b}	Total PCB (Metric tons) ^{a, c}	Mercury (Metric tons) ^{a, c}
Below RM8 (all sediment textures)	Mass (based on extrapolated cores)	11	29	8	37
RM8 to RM12 (silt, silt and sand)	Mass	0.099	0.81	1.0	1.8
	Percent of Inventory Below RM8	0.9 %	2.8 %	13 %	4.9 %
RM8 to RM15 (silt, silt and sand)	Mass	0.18	1.5	1.9	3.2
	Percent of Inventory Below RM8	1.6 %	5.1 %	24 %	8.6 %

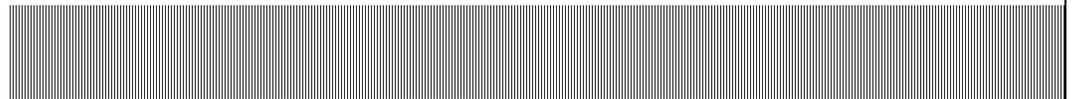
a: Values rounded to two significant figures.

b: Inventory estimates above RM8 for Total DDT and 2,3,7,8-TCDD are best represented by RM8 to RM12 since the most significant sources of these contaminants are in the Lower Passaic River. See text for discussion.

c: Inventory estimates above RM8 for Total PCB and mercury are best represented by estimates in RM8 to RM15 since it appears that significant loading of these contaminants is derived from the Upper Passaic River. See text for discussion.

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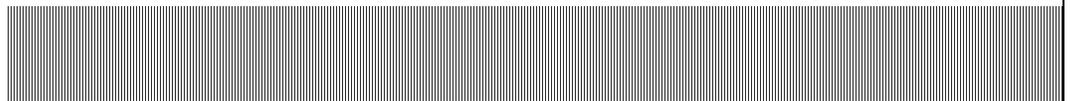
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Chapter 17 Tables

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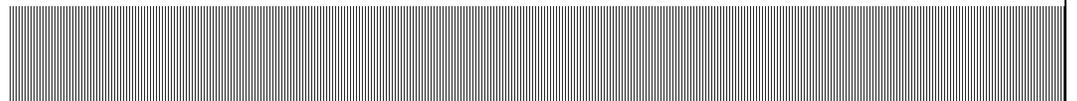


Table 18-1: Independent Parameters Directly Optimized in the EMB Model

Chemical Class	Chemical Name
Metals	Chromium
	Copper
	Lead
	Mercury
PCDD/F	2,3,7,8-TCDD
	Total TCDD
Pesticides	4,4'-DDE
	Chlordane, gamma
PAH	Benzo[a]pyrene
	Fluoranthene
PCB Congeners and Co-Elutions	Total PCB
Other Parameters	Total Organic Carbon (TOC)
	Iron

Table 18-2: Additional Parameters Directly Optimized in the EMB Model

Chemical Class	Chemical Name
Metals	Arsenic
	Cadmium
	Cobalt
	Nickel
	Zinc
PAH Compounds	Benz[a]anthracene
	Chrysene
	Indeno[1,2,3-cd]pyrene
	Pyrene

Table 18-3: Average Resuspension (Lower Passaic River) Concentrations for Selected Contaminants

Analyte	Resuspension (Lower Passaic River) Concentrations
Arsenic (mg/kg)	11
Cadmium (mg/kg)	5.1
Chromium (mg/kg)	150
Cobalt (mg/kg)	11
Copper (mg/kg)	230
Lead (mg/kg)	330
Mercury (mg/kg)	3.3
Nickel (mg/kg)	45
Zinc (mg/kg)	560
Trans-Chlordane (µg/kg)	26
DDE (µg/kg)	66
2,3,7,8-TCDD (µg/kg)	0.81
Total TCDD (µg/kg)	0.96
Total PCB (ug/kg)	2060
Benz[a]anthracene (mg/kg)	2.5
Benzo[a]pyrene (mg/kg)	2.4
Chrysene (mg/kg)	3.1
Fluoranthene (mg/kg)	5.2
Indeno[1,2,3-cd]pyrene (mg/kg)	0.9
Pyrene (mg/kg)	5.5
Iron (mg/kg)	25000
TOC (%)	10

Concentrations rounded to two significant figures, whenever possible.

Table 18-4: Newark Bay Northern End and Southern End Average Concentrations for Selected Contaminates

Analyte	Average Northern Concentration ^b	Average Southern Concentration ^c
Arsenic (mg/kg)	11	10
Cadmium (mg/kg)	1.5	.63
Chromium (mg/kg)	110	67
Cobalt (mg/kg)	10	10
Copper (mg/kg)	130	82
Lead (mg/kg)	125	77
Mercury (mg/kg)	2.2	0.93
Nickel (mg/kg)	35	33
Zinc (mg/kg)	250	160
Trans-Chlordane (µg/kg) ^a	4.8	3.8
DDE (µg/kg)	25	14
2,3,7,8-TCDD (ng/kg)	86	23
Total TCDD (ng/kg)	180	65
Total PCB (ug/kg)	580	260
Benz[a]anthracene (mg/kg)	1.5	0.44
Benzo[a]pyrene (mg/kg)	1.8	0.47
Chrysene (mg/kg)	1.7	0.44
Fluoranthene (mg/kg)	2.4	0.60
Indeno[1,2,3-cd]pyrene (mg/kg)	0.8	0.32
Pyrene (mg/kg)	2.7	0.65
Iron (mg/kg)	29900	29500
TOC (%)	2.6	1.7

a. Newark Bay samples from the 2005 sampling event were reported non-detect for chlordane. The value used here is from Phase 2 Dataset, 2007.

b. The samples used to delineate the northern Newark Bay end member were NB01SED46, NB01SED47, NB01SED52, NB01SED52 (dup), NB01SED55 and NB01SED61 from Phase 1 dataset and NB02SED078, NB02SED094, NB02SED104, NB02SED106, and NB02SED107 from Phase 2 dataset.

c. The five samples used to delineate the southern Newark Bay end member were NB01SED017, NB01SED021, NB01SED024, NB01SED030 and NB01SED031 from Phase 1 dataset.

Table 18-5: Upper Passaic River Recently Deposited Surface Sediment Concentrations for Select Contaminants

Analyte	Upper Passaic River Concentrations
Arsenic (mg/kg)	2.9
Cadmium (mg/kg)	1.5
Chromium (mg/kg)	31
Cobalt (mg/kg)	8.8
Copper (mg/kg)	63
Lead (mg/kg)	130
Mercury (mg/kg)	0.72
Nickel (mg/kg)	19
Zinc (mg/kg)	290
Trans-Chlordane (µg/kg)	23
DDE (µg/kg)	13
2,3,7,8-TCDD (ng/kg)	1.9
Total TCDD (ng/kg)	42
Total PCB (ug/kg)	420
Benz[a]anthracene (mg/kg)	4.7
Benzo[a]pyrene (mg/kg)	5.6
Chrysene (mg/kg)	6.4
Fluoranthene (mg/kg)	9.1
Indeno[1,2,3-cd]pyrene (mg/kg)	3.5
Pyrene (mg/kg)	9.1
Iron (mg/kg)	16200
TOC (%)	3.7

Concentrations rounded to two significant figures, whenever possible.

Table 18-6: Tributary Average Concentrations for Select Contaminants

Analyte	Saddle River	Third River	Second River
Arsenic (mg/kg)	3.6	5.7	3.4
Cadmium (mg/kg)	0.41	1.4	0.75
Chromium (mg/kg)	20	35	25
Cobalt (mg/kg)	4.4	5.7	4.9
Copper (mg/kg)	43	68	42
Lead (mg/kg)	57	150	170
Mercury (mg/kg)	0.1	0.48	0.26
Nickel (mg/kg)	10	20	21
Zinc (mg/kg)	150	260	220
Trans-Chlordane (µg/kg)	55	77	27
DDE (µg/kg)	19	46	26
2,3,7,8-TCDD (ng/kg)	2.9	2	0.9
Total TCDD (ng/kg)	25	24	11
Total PCB	480	190	100
Benz[a]anthracene (mg/kg)	2.8	3.4	2.92
Benzo[a]pyrene (mg/kg)	3.7	4.3	3.3
Chrysene (mg/kg)	4.6	5.6	4.2
Fluoranthene (mg/kg)	8.7	9.5	8.4
Indeno[1,2,3-cd]pyrene (mg/kg)	2.8	3.3	2.5
Pyrene (mg/kg)	7.3	8	7
Iron (mg/kg)	11400	14300	14300
TOC (%)	4.1	5.5	4.5

Concentrations rounded to two significant figures, whenever possible

Table 18-7: Average CSO and SWO Concentrations for Select Contaminants

Analyte	Average CSO Concentrations	Average SWO Concentrations
Arsenic (mg/kg)	6.2	19
Cadmium (mg/kg)	2.1	1.7
Chromium (mg/kg)	63	104
Cobalt (mg/kg)	7.9	15
Copper (mg/kg)	300	270
Lead (mg/kg)	370	360
Mercury (mg/kg)	0.95	0.82
Nickel (mg/kg)	46	57
Zinc (mg/kg)	800	900
Trans-Chlordane (µg/kg)	28	130
DDE (µg/kg)	24	59
2,3,7,8-TCDD (ng/kg)	4.1	20
Total TCDD (ng/kg)	68	120
Total PCB (ug/kg)	880	406
Benz[a]anthracene (mg/kg)	1.7	5.9
Benzo[a]pyrene (mg/kg)	2	9.7

Chrysene (mg/kg)	3.6	29
Fluoranthene (mg/kg)	5.4	38
Indeno[1,2,3-cd]pyrene (mg/kg)	2	8.7
Pyrene (mg/kg)	5.2	38
Iron (mg/kg)	20900	44200
TOC (%)	30	19

Concentrations rounded to two significant figures.

Table 18-8: Average Lower Passaic River Surface Sediment Concentrations for Select Contaminants

Analyte	Average Mainstem (RM2 – RM12) Concentration
Arsenic (mg/kg)	8.0
Cadmium (mg/kg)	3.6
Chromium (mg/kg)	110
Cobalt (mg/kg)	8.6
Copper (mg/kg)	160
Lead (mg/kg)	210
Mercury (mg/kg)	1.9
Nickel (mg/kg)	32
Zinc (mg/kg)	490
Trans-Chlordane (µg/kg)	36
DDE (µg/kg)	52
2,3,7,8-TCDD (ng/kg)	370
Total TCDD (ng/kg)	530
Total PCB (ug/kg)	1200
Benz[a]anthracene (mg/kg)	2.8
Benzo[a]pyrene (mg/kg)	3.6
Chrysene (mg/kg)	4.1
Fluoranthene (mg/kg)	5.9
Indeno[1,2,3-cd]pyrene (mg/kg)	2.5
Pyrene (mg/kg)	5.8
Iron (mg/kg)	26400
TOC (%)	6.3

Concentrations rounded to two significant figures, whenever possible.

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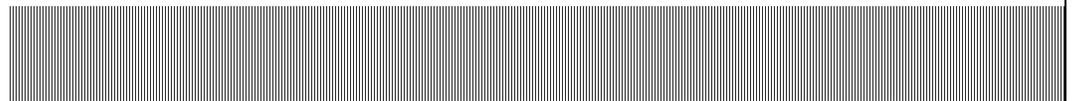


Table 19-1: Contaminant Burden Attributed to Resuspension

Analyte	Percent of Contaminant Burden in Recently Deposited Sediments Attributed to Resuspension and Confidence Interval
Chromium	≈ 74 (44 to 88)
Copper	≈ 72 (45 to 85)
Lead	≈ 71 (48 to 83)
Mercury	≈ 75 (43 to 88)
Chlordane	≈ 52 (32 to 70)
DDE	≈ 78 (52 to 88)
2,3,7,8-TCDD	≈ 97 (87 to 100)
Total TCDD	≈ 92 (76 to 97)
Total PCB	≈ 81 (59 to 90)
Benzo[a]pyrene	≈ 33 (17 to 52)
Fluoranthene	≈ 40 (21 to 58)
Iron	≈ 54 (29 to 72)
TOC	≈ 72 (48 to 83)

Table 19-2: Summary of Solid Contribution Results for Best Estimate, SWO, and Relaxed Solid Constraint Sensitivity Scenarios

Best Estimate Scenario							
Chemical	RSP	NWB	UPR	SDR	SCR/SWO	THR	CSO
Solids	48%	14%	32%	4%	1%	2%	0%
Copper	72%	12%	14%	1%	0%	0%	1%
Chromium	74%	15%	10%	1%	0%	0%	0%
Iron	54%	18%	24%	2%	1%	1%	0%
Mercury	75%	14%	11%	0%	0%	0%	0%
Lead	71%	7%	19%	1%	1%	1%	1%
Chlordane	52%	3%	32%	8%	2%	3%	1%
DDE	78%	8%	10%	2%	1%	1%	0%
2,3,7,8-TCDD	97%	3%	0%	0%	0%	0%	0%
Total TCDD	92%	5%	3%	0%	0%	0%	0%
Total PCB	81%	6%	11%	1%	0%	0%	0%
Benzo(a)pyrene	33%	7%	53%	4%	1%	1%	0%
Fluoranthene	40%	5%	47%	5%	2%	1%	0%
TOC	72%	5%	17%	2%	1%	1%	2%

Table 19-2: Summary of Solid Contribution Results for Best Estimate, SWO, and Relaxed Solid Constraint Sensitivity Scenarios

SWO Sensitivity Scenario								
Chemical	%RSP	%NWB	%UPR	%SDR	%2R	%3R	%SWO	%CSO
Solids	47%	17%	31%	3%	0%	1%	1%	0%
Copper	69%	14%	13%	1%	0%	0%	2%	1%
Chromium	70%	18%	9%	1%	0%	0%	1%	0%
Iron	51%	22%	22%	2%	0%	0%	2%	0%
Mercury	72%	17%	10%	0%	0%	0%	0%	0%
Lead	69%	9%	18%	1%	0%	0%	2%	1%
Chlordane	50%	3%	30%	8%	0%	2%	7%	1%
DDE	76%	10%	10%	2%	0%	1%	2%	0%
2,3,7,8-TCDD	96%	4%	0%	0%	0%	0%	0%	0%
Total TCDD	91%	6%	3%	0%	0%	0%	0%	0%
Total PCB	79%	8%	11%	1%	0%	0%	0%	0%
Benzo(a)pyrene	33%	8%	51%	4%	0%	1%	3%	0%
Fluoranthene	37%	6%	43%	5%	0%	1%	7%	0%
TOC	70%	6%	16%	2%	0%	1%	3%	2%

Table 19-2: Summary of Solid Contribution Results for Best Estimate, SWO, and Relaxed Solid Constraint Sensitivity Scenarios

Relaxed Solids Constraint Scenario							
Chemical	RSP	NWB	UPR	SDR	SCR/SWO	THR	CSO
SolidsStd	42%	20%	32%	4%	2%	1%	0%
Copper	65%	18%	14%	1%	1%	0%	1%
Chromium	65%	23%	10%	1%	0%	0%	0%
Iron	46%	27%	23%	2%	1%	0%	0%
Mercury	67%	21%	11%	0%	0%	0%	0%
Lead	65%	12%	19%	1%	2%	1%	1%
Chlordane	48%	4%	33%	9%	2%	3%	1%
DDE	72%	13%	11%	2%	1%	1%	0%
2,3,7,8-TCDD	95%	5%	0%	0%	0%	0%	0%
Total TCDD	89%	8%	3%	0%	0%	0%	0%
Total PCB	76%	10%	12%	1%	0%	0%	0%
Benzo(a)pyrene	30%	11%	53%	4%	2%	1%	0%
Fluoranthene	36%	8%	47%	5%	3%	1%	0%
TOC	67%	8%	18%	2%	1%	1%	2%

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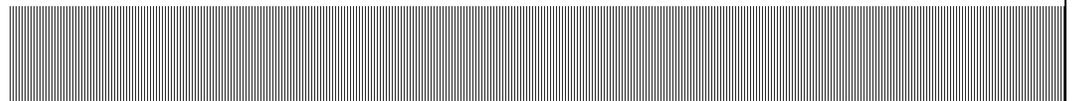


Table 20-1: Comparison on the Average 1980s Concentrations and 2005 Surface Sediment Concentrations for Select COPCs

Analyte	Average 1980s Decadal Concentration	Average 2005 Surface Sediment Concentration
Mercury (mg/kg)	3.3	1.8
Lead (mg/kg)	320	210
Copper (mg/kg)	180	150
Total Chlordane (µg/kg)	85	70
Dieldrin (µg/kg)	2.4	5.8
DDE (µg/kg)	110	54
2,3,7,8-TCDD (ng/kg) ^a	560	430
PCDD/F TEQ (µg/kg) ^{a, b}	0.67	0.49
Total PCB (µg/kg) ^a	2,500	1,000
PCB TEQ (µg/kg) ^{a, b}	0.16	0.083
LMW PAH (mg/kg)	10	10
HMW PAH (mg/kg)	25	28

a: Average decadal concentration for only three river locations (RM1.4, RM2.2, and RM11)

b: Mammal TEQ estimate

Concentrations rounded to two significant figures.

Table 20-2: Estimated Half-Lives for COPCs Based on High Resolution Cores from 2005 and Surface Samples in 2007.

Analyte	Half Life (Confidence Interval) 1980-2007 (years)
Mercury (mg/kg)	34 (19-173)
Lead (mg/kg)	39.5 (23-151)
Copper (mg/kg)	57 (30.7-405)
Total Chlordane (µg/kg)	99
DDE (µg/kg)	No half-life
Dieldrin (µg/kg)	19 (13-33)
2,3,7,8-TCDD (ng/kg) ^a	25 (14-101)
PCDD/F TEQ (µg/kg) ^a	25 (14-101)
Total PCB (µg/kg) ^a	26 (16-61)
PCB TEQ (µg/kg) ^a	26 (16-61)
HMW PAH (mg/kg)	63
LMW PAH (mg/kg)	44

1 No statistically significant trend – assume flat trend (infinite half-life)

2 Increasing trend - this trend cannot be forecasted.

Note: half-life estimates are rounded to the nearest 5 years.

Table 20-3: Unitless TEF Values for Mammal, Fish and Bird Exposure

Analyte	1998 Mammal TEF	2005 Mammal TEF	Fish TEF	Bird TEF
PCDD/F TEF Values				
2,3,7,8- TCDD	1	1	1	1
1,2,3,7,8-PeCDD	1	1	1	1
1,2,3,4,7,8-HxCDD	0.1	0.1	0.5	0.05
1,2,3,6,7,8-HxCDD	0.1	0.1	0.01	0.01
1,2,3,7,8,9-HxCDD	0.1	0.1	0.01	0.1
1,2,3,4,6,7,8-HpCDD	0.01	0.01	0.001	0.001
OCDD	0.0001	0.0003	0.0001	0.0001
2,3,7,8-TCDF	0.1	0.1	0.05	1
1,2,3,7,8-PeCDF	0.05	0.03	0.05	0.1
2,3,4,7,8-PeCDF	0.5	0.3	0.5	1
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1	0.1
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1	0.1
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.01	0.01
OCDF	0.0001	0.0003	0.0001	0.0001
PCB TEF Values				
3,3',4,4'-Tetrachlorobiphenyl (77)	0.0001	0.0001	0.0001	0.05
3,4,4',5-Tetrachlorobiphenyl (81)	0.0001	0.0003	0.0005	0.1
3,3',4,4',5-Pentachlorobiphenyl (126)	0.1	0.1	0.005	0.1
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	0.01	0.03	0.00005	0.001
2,3,3',4,4'-Pentachlorobiphenyl (105)	0.0001	0.00003	0.000005	0.0001
2,3,4,4',5-Pentachlorobiphenyl (114)	0.0005	0.00003	0.000005	0.0001
2,3',4,4',5-Pentachlorobiphenyl (118)	0.0001	0.00003	0.000005	0.00001
3,4,4',5-Pentachlorobiphenyl (123)	0.0001	0.00003	0.000005	0.00001
2,3,3',4,4',5-Hexachlorobiphenyl (156)	0.0005	0.00003	0.000005	0.0001
2,3,3',4,4',5'-Hexachlorobiphenyl (157)	0.0005	0.00003	0.000005	0.0001
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	0.00001	0.00003	0.000005	0.00001
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	0.0001	0.00003	0.000005	0.00001

Data source: Van den Berg *et al.*, 1998 and Van den Berg *et al.*, 2005.

Table 20-4: Multipliers for estimated TEQs for Dioxin and PCBs

TEQ Comparison	Ratio
Fish TEQ / 2,3,7,8-TCDD concentration	1.2
Bird TEQ / 2,3,7,8-TCDD concentration	1.4
2005 Mammal TEQ / 2,3,7,8-TCDD concentration	1.3
Fish TEQ / Total PCB concentration	1.4×10^{-6}
Bird TEQ / Total PCB concentration	2.6×10^{-4}
2005 Mammal TEQ / Total PCB concentration	2.1×10^{-5}

Table 20-5: Forecasted 0-6 inch Biologically Active Surface Sediment Concentrations for Natural Recovery (No Action)

Analyte	Forecasted 2075 Concentration	Percent Reduction from 2005 to 2075
Mercury (mg/kg)	1.32	53%
Lead (mg/kg)	167.327	42%
Copper (mg/kg)	115.605	34%
Chlordane, gamma (µg/kg)	23.617	-2%
DDE (µg/kg)	21.253	66%
2,3,7,8-TCDD (ng/g)	0.139	77%
PCDD/F TEQ Bird (µg/kg)	0.192	77%
PCDD/F TEQ Mammal (µg/kg)	0.177	77%
PCDD/F TEQ Fish (µg/kg)	0.173	77%
Total PCB (µg/kg)	679.229	65%
PCB TEQ Bird (µg/kg)	0.001	80%
PCB TEQ Mammal (µg/kg)	0.016	74%
PCB TEQ Fish (µg/kg)	0.257	74%
HMW PAH (mg/kg)	42.645	0%

Concentrations rounded to two significant figures.

Table 20-6: Forecasted 0-6 inch Biologically Active Surface Sediment Concentrations for Remediation of Primary Erosional Zone and Primary Inventory Zone

Analyte	Forecasted 2075 Concentration	Percent Reduction from 2005 to 2075
Mercury (mg/kg)	1.15	59%
Lead (mg/kg)	148.23	49%
Copper (mg/kg)	101.081	43%
Chlordane, gamma (µg/kg)	22.848	1%
DDE (µg/kg)	18.619	71%
2,3,7,8-TCDD (ng/g)	0.099	84%
PCDD/F TEQ Bird (µg/kg)	0.137	84%
PCDD/F TEQ Mammal (µg/kg)	0.126	84%
PCDD/F TEQ Fish (µg/kg)	0.123	84%
Total PCB (µg/kg)	583.462	70%
PCB TEQ Bird (µg/kg)	0.001	80%
PCB TEQ Mammal (µg/kg)	0.013	79%
PCB TEQ Fish (µg/kg)	0.205	79%
HMW PAH (mg/kg)	40.279	5%

Concentrations rounded to two significant figures.

Table 20-7: Time Required for Natural Recovery Trajectory to Reach Level of Recovery Predicted for Remediation of Primary Erosional Zone

Analyte	Peak Concentration for Remediation Trajectory (after 2018)	Time for Natural Recovery to Reach Remedial Peak Concentration (yr)
Mercury (mg/kg)	1.417	170
Lead (mg/kg)	157.448	180
Copper (mg/kg)	100	100
Chlordane, gamma (µg/kg)	N/A ¹	N/A ¹
DDE (µg/kg)	28	100
2,3,7,8-TCDD (ng/g)	0.27	180
Total PCB (µg/kg)	876.076	170
HMW PAH (mg/kg)	42.615	160

1. Chlordane trajectory is flat for natural recovery, so the remediation trends increase from the year 2018 until they asymptote at the natural recovery constant value. These trends are not applicable to this type of comparison.

Note: Concentrations rounded to two significant figures. Time values rounded to nearest five years

Table 20-8: Forecasted 0-6 inch Biologically Active Surface Sediment Concentrations for Remediation of RM0 to RM8

Analyte	Forecasted 2075 Concentration	Percent Reduction from 2005 to 2075
Mercury (mg/kg)	0.857	25%
Lead (mg/kg)	115.598	22%
Copper (mg/kg)	76.023	25%
Chlordane, gamma (µg/kg)	18.829	18%
DDE (µg/kg)	14.227	24%
2,3,7,8-TCDD (ng/kg)	0.028	72%
PCDD/F TEQ Bird (µg/kg)	0.038	72%
PCDD/F TEQ Mammal (µg/kg)	0.035	72%
PCDD/F TEQ Fish (µg/kg)	0.034	72%
Total PCB (µg/kg)	420.125	28%
PCB TEQ Bird (µg/kg)	0.001	0%
PCB TEQ Mammal (µg/kg)	0.007	46%
PCB TEQ Fish (µg/kg)	0.117	43%
HMW PAH (mg/kg)	36.554	9%

Concentrations rounded to two significant figures.

Table 20-9: Time Required for Natural Recovery Trajectory and Primary Erosional Zone Trajectory to Reach Level of Recovery Predicted for Remediation of RM0 to RM8

Analyte	Peak Concentration for Remediation Trajectory (after 2018)	Time for Natural Recovery to Reach Remedial Peak Concentration (yr)	Time for Primary Erosional Zone to Reach Remedial Peak Concentration (yr)
Mercury (mg/kg)	0.864	220	220
Lead (mg/kg)	121.835	230	230
Copper (mg/kg)	79	320	310
Chlordane, gamma (ug/kg)	N/A ¹	N/A ¹	N/A ¹
DDE (ug/kg)	14	130	130
2,3,7,8-TCDD (ng/g)	0.031	330	280
Total PCB (ug/kg)	424.963	230	230
HMW PAH (mg/kg)	42.63	190	200

1. Chlordane trajectory is flat for natural recovery, so the remediation trends increase from the year 2018 until they asymptote at the natural recovery constant value. These trends are not applicable to this type of comparison.

Note: Concentrations rounded to two significant figures. Time values rounded to nearest five years.

Table 20-10: Comparisons of Remedial Scenarios and PRGs for the Year 2075

Analyte	PRG (Background Value from Upper Passaic River Samples)	Remedial Scenario (Forecast Concentration in 0 to 6 inch Surface Layer)		
		Natural Recovery (No Action)	Remediation of Primary Erosional Zone and Primary Inventory Zone	Remediation of RM0 to RM8
Mercury (mg/kg)	0.72	1.4	1.2	0.93
Lead (mg/kg)	130	150	130	102
Copper (mg/kg)	63	120	102	77
Chlordane, gamma (ug/kg)	32	30	27	22
DDE (ug/kg)	13	23	23	16
2,3,7,8-TCDD (ng/g)	1.9	140	100	28
Total PCB (ug/kg)	580	620	540	420
HMW PAH (mg/kg)	53	37	34	29

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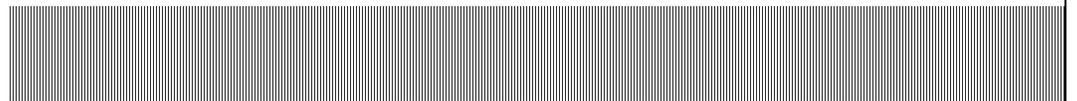


Table 21-1: Estimated Mass Balance for Solids for Newark Bay

Source of Solids	Lowe et al. Mass Balance (cubic yards)	Estimated Mass Balance (cubic yards) ^a
Passaic River	79,000 ^b	12,000
Hackensack River	6,500	6,500
Combined Sewer/Water Treatment	10,500	10,500
Atmospheric Deposition	285	285
Kill van Kull	205,000	260,000
Arthur Kill	42,000	53,000

a: Based on Lowe *et al.* (2005); Balance is based on a correction for deposition in the Lower Passaic River.

b: The delivery of solids from the Upper Passaic is estimated by the Comprehensive Conceptual Site Model to be about 55,000 cy (Refer to Chapter 18).

Table 21-2: Surface Concentrations Used in the Initial Mass Balances for Newark Bay

Source	2,3,7,8-TCDD Concentration ($\mu\text{g}/\text{kg}$) ^{a,b}	Total TCDD Concentration ($\mu\text{g}/\text{kg}$) ^{a,b}	Ratio of 2,3,7,8-TCDD to Total TCDD (unitless)	Mercury Concentration (mg/kg) ^{a,b}
Passaic River (RM 1 to 7)	0.54 (N = 255)	0.68 (N = 255)	0.8	3.4 (N=104)
Mouth of Hackensack River	0.093 (N = 5)	0.14 (N = 5)	0.67	4.0 (N=5)
CSO/WWTP ^c	UK ^d	UK	UK	UK
Atmospheric Deposition	UK	UK	UK	UK
Kill van Kull	0.01 ^e	0.07 ^e	0.15	1.1 (N=5)
Arthur Kill	0.05	0.18	0.28	1.6 (N=4)
Newark Bay	0.076 (N = 32)	0.16 (N = 32)	0.56	2.4 (N=48)

a: Average (sample size)

b: Concentrations represent average surface sediment concentrations from 1991 to 1995, unless otherwise noted.

c: CSO = Combined sewage overflow; WWTP = Waste water treatment plant

d: UK = unknown value.

e. Concentration represents New York harbor sediments from dated sediment cores at the entry to Kill van Kull 1994-1998 (Chaky, 2003).

Table 21-3: Updated Mass Balance for Solids for Newark Bay

Source of Solids	Lowe <i>et al.</i> Mass Balance (cubic yards) ^a	Estimated Mass Balance - Solids Only (cubic yards) ^a	Estimated Mass Balance - Chemistry and Solids (cubic yards)
Passaic River	79,000	12,000	32,000
Hackensack River	6,500	6,500	6,500
Combined Sewer/Water Treatment	10,500	10,500	10,500
Atmospheric Deposition	285	285	285
Kill van Kull	205,000	260,000	240,000
Arthur Kill	42,000	53,000	50,000

a: From Table 21-1

Table 21-4: Initial 2,3,7,8-TCDD Mass Balance for Newark Bay

Source	Solids Mass Balance ^a		2,3,7,8-TCDD Concentration (µg/kg) ^b	2,3,7,8-TCDD Annual Load (g/year)	Total TCDD Concentration (µg/kg) ^b	Total TCDD Annual Load (g/year)	Ratio of 2,3,7,8-TCDD to Total TCDD (unitless)
	cubic yard/year	Metric-ton/year					
Passaic River (RM 1 to 7)	35,000	21,000	0.54	12	0.68	14	0.8
Mouth of Hackensack River	6,500	3,900	0.093	0.36	0.14	0.54	0.67
CSO/WWTP ^c	10,500	6,300	UK ^d	UK	UK	UK	UK
Atmospheric Deposition	285	170	UK	UK	UK	UK	UK
Kill van Kull	240,000	120,000	0.01 ^e	1.16	0.07	7.7	0.15
Arthur Kill	50,000	24,000	0.05	1.19	0.18	4.2	0.28
Total	340,000	170,000		14		26	
Newark Bay Calculated			0.083		0.15		0.53
Newark Bay Measured			0.076		0.16		0.56
Total Annual Load	340,000 cubic yard/year			14 g/year		26 g/year	

a: Solids mass balance based on Lowe, *et al.* (2005) with several adjustments made to satisfy the chemical mass balance (Section 4.6.1). Conversion of sediment volume to sediment mass as given by Lowe, *et al.* (2005).

b: Concentrations represent average surface sediment concentrations for 1991 to 1995 sediments, unless otherwise noted.

c: CSO = Combined sewage overflow; WWTP = Waste water treatment plant

d: UK = unknown value. Mass fluxes for sources within unknown values were set to zero for the chemical mass balance.

e. Concentration represents mean New York harbor sediments at the entry to Kill van Kull 1994-1998 (Chaky, 2003).

Table 21-5: Updated 2,3,7,8-TCDD Mass Balance for Newark Bay

Source	Solids Mass Balance ^a		2,3,7,8-TCDD Concentration (µg/kg) ^{b,c}	2,3,7,8-TCDD Annual Load (g/year)	Total TCDD Concentration (µg/kg) ^{b,c}	Total TCDD Annual Load (g/year)	Ratio of 2,3,7,8-TCDD to Total TCDD (unitless)
	cubic yard/year	Metric-ton/year					
Passaic River (RM 1 to 12)	32,000	19,000	0.3	5.8	0.46	8.9	0.65
Mouth of Hackensack River	6,500	3,900	0.09	0.36	0.14	0.54	0.67
CSO/WWTP ^d	10,500	6,300	0.0031	0.02	0.06	0.39	0.05
Atmospheric Deposition	285	170	UK ^e	UK	UK	UK	UK
Kill van Kull	240,000	120,000	0.01 ^f	1.2	0.07	8.4	0.14
Arthur Kill	50,000	24,000	0.05	1.2	0.18	4.3	0.28
Total	340,000	170,000		8.6		23	
Newark Bay Calculated			0.050		0.13		0.38
Newark Bay Measured			0.050		0.11		0.28
Total Annual Load	340,000 cubic yard/year			8.6 g/year		23 g/year	

a: Solids mass balance based on Lowe, *et al.* (2005) with several adjustments made to satisfy the chemical mass balance. Conversion of sediment volume to sediment mass as given by Lowe, *et al.* (2005).

b: Concentrations for the mouth of Hackensack River, Kill van Kull, and Arthur Kill represent average surface sediment concentrations for 1991 to 1995 sediments, unless otherwise noted.

c: Concentrations for the Passaic River and CSOs/SWOs represent average surface sediment and suspended solids concentrations from the 2007-2008 sampling event; measured Newark Bay concentrations represent average surface sediment concentrations for 2005 sediments.

d: CSO = Combined sewage overflow; WWTP = Waste water treatment plant

e: UK = unknown value. Mass fluxes for sources within unknown values were set to zero for the chemical mass balance.

f: Concentration represents mean New York harbor sediments at the entry to Kill van Kull 1994-1998 (Chaky, 2003).

Table 21-6: Initial Mercury Mass Balance for Newark Bay

Source	Solids Mass Balance ^a		Mercury Concentration (mg/kg) ^b	Mercury Annual Load (g/year)
	Cubic yard/year	Metric-ton/year		
Passaic River (RM 1 to 7)	35,000	21,000	3.4	73,000
Mouth of Hackensack River	6,500	3,900	4.0	16,000
CSO/WWTP ^c	10,500	6,300	UK ^d	UK
Atmospheric Deposition	285	170	UK	UK
Kill van Kull	240,000	120,000	1.1	132,000
Arthur Kill	50,000	24,000	1.6	38,000
Total	340,000	170,000		259,000
Newark Bay Calculated			1.5	
Missing Mercury Source				150,000
New Newark Bay Calculated			2.4	
Newark Bay Measured			2.4	
Net Annual Load				409,000 g/year

a: Solids mass balance based on Lowe, *et al.* (2005) with several adjustments made to satisfy the chemical mass balance. See text for discussion. Conversion of sediment volume to sediment mass as given by Loewe, *et al.*, 2005.

b: Mercury concentrations represent average surface sediment concentrations for 1991 to 1995 sediments.

c: CSO = Combined sewage overflow; WWTP = Waste water treatment plant

d: UK = unknown value. Mass fluxes for sources within unknown values were set to zero for the chemical mass balance.

Table 21-7: Updated Mercury Mass Balance for Newark Bay

Source	Solids Mass Balance ^a		Mercury Concentration	Mercury Annual Load
	Cubic yard/year	Metric-ton/year	(mg/kg) ^{b,c}	(g/year)
Passaic River (RM 1 to 12)	32,000	19,000	1.9	37,000
Mouth of Hackensack River	6,500	3,900	4.0	15,000
CSO/WWTP ^d	10,500	6,300	1.0	6,300
Atmospheric Deposition	285	170	UK ^e	UK
Kill van Kull	240,000	120,000	1.1	134,000
Arthur Kill	50,000	24,000	1.6	39,000
Total	340,000	170,000		232,000
Newark Bay Calculated			1.35	
Missing Mercury Source				None ^f
Newark Bay Measured			1.37	
Net Annual Load				235,000 g/year

a: Solids mass balance based on Lowe, *et al.* (2005) with several adjustments made to satisfy the chemical mass balance. See text for discussion. Conversion of sediment volume to sediment mass as given by Loewe, *et al.*, 2005.

b: Mercury concentrations for the Mouth of Hackensack River, Kill van Kull, and Arthur Kill represent average surface sediment concentrations for 1991 to 1995 sediments.

c: Mercury concentrations for the Passaic River and CSO/SSO represent average surface sediment concentrations for 2007 sediments; measured mercury concentrations for Newark Bay represent average surface sediment concentrations for 2005 sediments.

d: CSO = Combined sewage overflow; WWTP = Waste water treatment plant

e: UK = unknown value. Mass fluxes for sources within unknown values were set to zero for the chemical mass balance.

f: The differences between the calculated load and the estimated of the measured load is within the precision of the calculations.

Table 21-8: Summary of Initial vs. Revised Mass Balance Results

Source	Initial Solids (percent)	Revised Solids (percent)	Initial 2,3,7,8-TCDD (percent)	Revised 2,3,7,8-TCDD (percent)	Initial Mercury (percent)	Revised Mercury (percent)
Passaic River (RM 1 to 12)	10	11	80	70	20	16
Mouth of Hackensack River	2	2	3	4	4	7
CSO/WWTP	3	4	UK ^a	0.2	UK ^a	3
Atmospheric Deposition	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Kill van Kull	70	69	8	14	30	57
Arthur Kill	15	14	8	14	10	16
“Missing” Mercury	NA ^b	NA ^b	NA ^b	NA ^b	35	1
Total ^c	100	100	~100	~100	~100	~100

a: Contaminant concentrations on CSO and WWTP loads for the Lower Passaic River were not available for the chemical mass balance calculations. However, measurements on Newtown Creek discharges would suggest that the contribution for 2,3,7,8-TCDD is minor (Chaky, 2003) and on the order of the contributions by the Hackensack River.

b: Not applicable to solids and 2,3,7,8-TCDD mass balances.

c: Columns do not sum to exactly 100 percent in all cases due to rounding. Percent contributions were rounded to nearest increment of 5 percent for contributions greater than 10 percent.

Agency Backcheck
Comprehensive Conceptual Site Model
Lower Passaic River Restoration Project

Chapter 22 Tables

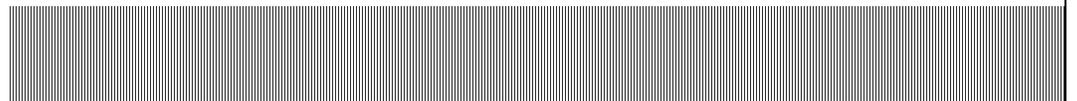


Table 22-1: Summary of contaminant tissue concentrations for blue crab, mummichog and white perch analyzed during Battelle biological data compilation.

Contaminant	Blue Crab			Mummichog			White Perch		
	minimum	maximum	mean	minimum	maximum	mean	minimum	maximum	mean
2,3,7,8-TCDD (pg/g)	0.002	0.67	0.105	0	0.83	0.076	0.002	0.47	0.19
Mercury (ng/g)	25	280	83.3	18.5	150	36.6	78.6	931	115.7
Total DDT (ng/g)	1.80	4.50	2.83	2.00	4.50	3.2	2.6	4.0	0.2
Lead (ng/g)	0	2400	402.1	0.00	2800	361.4	0	510	181.8
Total PAHs (µg/g)	1.8	5.7	2.8	2.00	4.5	3.4	2.6	4.0	3.0
Total PCBs (ng/g)	0.1	5.7	2.9	2.00	4.50	3.21	0.9	4.0	2.9

Table 22-2: 2,3,7,8-TCDD and mercury bioaccumulation factors for blue crab, mummichog and white perch in 1995, 1999 and 2000 datasets.

Species	Year	2,3,7,8-TCDD				Mercury			
		Bioaccumulation Factor (BAF)	Standard Error	Sample Size ^a & Tissue Type(s) ^b		Bioaccumulation Factor (BAF)	Standard Error	Sample Size & Tissue Type(s)	
Blue Crab	1995	0.25	0.18	6	Tissue ^c	0.043	0.009	6	Tissue
	1999	0.13	0.037	56	Tissue	0.023	0.002	65	Tissue
	2000	0.07	0.027	7	Tissue	0.032	0.004	7	Tissue
	All Points	0.13	0.039	69	Tissue	0.026	0.002	78	Tissue
Mummichog	1995	0.06	0.021	5	Tissue	0.026	0.010	3	Tissue
	1999	0.11	0.172	45	Tissue	0.010	0.001	51	Tissue
	2000	0.06	0.034	4	Tissue	0.013	0.006	6	Tissue
	All Points	0.10	0.033	54	Tissue	0.011	0.001	60	Tissue
White Perch	1995	n/a	n/a	n/a		n/a	n/a	n/a	
	1999	0.29	0.076	21	Tissue	0.071	0.005	29	Tissue
	2000	0.20	0.055	25	Tissue	0.109	0.009	35	Tissue
	All Points	0.25	0.065	46	Tissue	0.092	0.007	64	Tissue

Notes:

a) Sample size is the number of tissue samples used to calculate the average tissue concentration.

b) Tissue type is the tissue matrix that was analyzed (e.g., tissue, muscle).

c) Tissue types for blue crab include 2 hepatopancreas and 4 muscle samples.

n/a = no data was available

Table 22-3: Average 2,3,7,8-TCDD and mercury tissue concentrations for blue crab, mummichog, and white perch.

Species	Year	Lipid Values ^a (g/g)	2,3,7,8-TCDD			Mercury		
			Average Tissue Conc. (ppb)	Standard Error	Sample Size	Average Tissue Conc. ^b (ppb)	Standard Error	Sample Size
Blue Crab	1995	0.077	0.011	0.137	6	151	11.2	6
	1999		0.103	0.014	56	70	4.1	65
	2000		0.054	0.017	7	100	19.8	7
	All Points		0.106	0.016	69	79	4.1	78
Mummichog	1995	0.023	0.053	0.010	5	83	33.3	3
	1999	0.033	0.086	0.138	45	33	9.4	51
	2000	0.028	0.045	0.026	4	37	3.7	6
	All Points		0.080	0.017	54	36	2.4	60
White Perch	1995	0.0404	n/a	n/a	n/a	n/a	n/a	n/a
	1999		0.238	0.008	21	231	4.5	29
	2000		0.166	0.014	25	353	20.3	35
	All Points		0.199	0.014	46	298	15.3	64

Notes:

- a) Average lipid percent based on tissue concentration for each species type. Lipid value are based from literature and not from samples.
 - b) Tissue concentration (ppb) is based on chemical concentration in the tissue (ug) over tissue mass (kg).
- n/a = no data was available

Table 22-4: Average and TOC-normalized surface sediment concentrations for 2,3,7,8-TCDD and mercury for samples collected in 1995 Passaic River Remedial Investigation sampling program.

Description	Average Sediment Conc. ^a (ng/g)	Standard Error	Sample Size
2,3,7,8-TCDD	0.8116	0.208	95
Mercury	3229	198.2	95
	Avg. TOC Normalized Sediment Conc. ^b (µg/kg)	Standard Error	Sample Size
2,3,7,8-TCDD	10.7	3.28	63
Mercury	41,403	4,427	89

Notes:

- a) Average Sediment Concentration (ppb) is based on the chemical concentration in the sediment (µg) over the sediment mass (kg). It is the average chemical concentrations of all the surface sediments samples from the 1995 event.
- b) Total Organic Carbon concentration (ppb) is based on organic carbon (µg) over sediment mass (kg).

Table 22-5: 2,3,7,8-TCDD and mercury BSAF values for blue crab, mummichog, and white perch for the 1995, 1999 and 2000 datasets.

Species	Year	2,3,7,8-TCDD				Mercury			
		BSAF Values ^b	Standard Error	Sample Size ^a & Tissue Type(s) ^b		BSAF Values	Standard Error	Sample Size & Tissue Type(s)	
Blue Crab	1995	0.013	0.17	6	Tissue ^c	0.047	0.006	6	Tissue
	1999	0.12	0.04	56	Tissue	0.022	0.003	65	Tissue
	2000	0.66	0.03	7	Tissue	0.0312	0.007	7	Tissue
	All Points	0.13	0.1	69	Tissue	0.0248	0.003	72	Tissue
Mummichog	1995	0.22	0.078	5	Tissue	0.089	0.037	3	Tissue
	1999	0.18	0.052	45	Tissue	0.024	0.007	51	Tissue
	2000	0.14	0.051	4	Tissue	0.032	0.005	6	Tissue
	All Points	0.33	0.12	54	Tissue	0.039	0.005	57	Tissue
White Perch	1995	n/a	n/a	n/a		n/a	n/a	n/a	
	1999	0.55	0.17	21	Tissue	0.138	0.015	29	Tissue
	2000	0.38	0.12	25	Tissue	0.21	0.026	35	Tissue
	All Points	0.46	0.14	46	Tissue	0.18	0.021	64	Tissue

Notes:

- a) Sample size is the number of tissue samples used to calculate the average tissue concentration.
 - b) Tissue type is the tissue matrix that was analyzed (*e.g.*, tissue, muscle).
 - c) Tissue types for blue crab include 2 hepatopancreas and 4 muscle samples.
- n/a = no data was available